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THE

EDINBURGH MEDICAL AND SURGICAL JOURNAL:

EXHIBITING

A CONCISE VIEW

OF THE

LATEST AND MOST IMPORTANT DISCOVERIES

IN

MEDICINE, SURGERY, AND PHARMACY.

VOLUME THIRTY-SECOND.

1829.

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THE

EDINBURGH
MEDICAL AND SURGICAL JOURNAL.

1. JULY 1829.

PART I.

ORIGINAL COMMUNICATIONS.

ART. I.—*Reports on the Diseases of Plymouth.* By EDWARD BLACKMORE, M. D. (Continued from Vol. xxxi. p. 287.)

TABLE II.

THE subjoined table exhibits the relative frequency and mortality of the more important diseases of Table First, at different ages, and in each sex. Column S contains the number of sick, column D the number of deaths.

Diseases.	Sex.	1st year.		2d year.		to 5.		to 10.		to 15.		to 20.		to 30.		t o 40		to 50.		to 60.		to 70.		above 70.		Under puberty.		Above puberty.	
		S.	D	S.	D.	S.	D.	S	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.
Anasarca,	*m.*	1	1	1		1		1	1									2	1	5		2	1	2		4	2	11	2
	f.					1		1				3		13	3	4		5	1	8		3		3	1	2		39	5
Ascites,	*m.*							2	2							2		2	1	1	1					2	2	5	2
	f.			1		2				1	1	4		3	1	8	4	5	2			1	1			4	1	21	8
Asthma or	*m.*					2				2				3		10	1	8		16	3	10	2	13	2	4		6	8
Dyspnœa,	*f.*	2		1		5				4		1		3		13	1	12		9	1	7	1	9	2	12		54	5
Apoplexia,	*m.*			1	1							2	2	1		1	1	2	2	2	1	2	1	1		1	1	11	7
	f.											1						1		2	1			1				6	1
Carditis,	*m.*							2	1	2		2		3		6	1	8	2	5		1				4	1	25	3
	f.							1		2	1	1		3	1	3	1	5		4						3	1	16	2
Convulsio,	*m.*	6	2	6	1	4	2			1				1												17	5	1	
	f.	5	4	4	1	1	1	2				2		2		1						1				12	6	6	
Catarrh,	*m.*	21		15	1	9		4				3		9		6		2		4		7		2		49	1	33	
	f.	25	2	12		10		2		6		8		14		10		18		13		6				55	2	72	

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Diseases.	Sex.	1st year.		2d year.		to 5.		to 10.		to 15.		to 20.		to 30.		to 40.		to 50.		to 60.		to 70.		above 70.		Under puberty.		Above puberty.	
		S.	D	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	D	S.	D.	S.	D.
Enteritis,	m.	5	3	16	1	12	2	16	1	2		1		7	1	8	1	4	1							39	7	20	3
	f.	3		9	2	15	3	8		1	1	4	2	14	2	12		9								36	6	39	4
Cholera, Diarrhœa. Dysent.	m.	43	2	47	1	24	2	9	1	6		5		14	1	14		13	1	4	1	7	2	3	2	129	6	60	7
	f.	33	2	29	1	7	2	9		9		12		27		28	2	18	1	11		5		1		87	5	82	3
Dyspepsia.	m	6		3		2						5		17		29		16		7	1	9		1		11		84	1
	f.	5		2		1				3		15		69		84		86		42		17		9		12		321	
Epilepsy,	m.							1		1		3		7		3										2		13	
	f.									3		1		6		3		1								3		11	
Erysipelas,	m.											1		4		2	1	1		1		2						11	1
	f.	1												2	1	5		4		4				1	1	1		16	2
Febris,	m.	5		8		14		30	1	20		16	2	28	3	23	3	8		6	1	3				77	1	84	9
	f.	4		7		19	1	29		22	2	35	3	50	3	31		16	1	8		8		2		81	3	150	7
Gastritis,	m.	3		7		8		7		3		2		10		5		9		8		4	2			28		38	2
	f.	3	1	6		3	1	4	1	8		8		25	1	16		10		12		10				24	3	81	1
Hepatitis & Icterus,	m.	1		1		1		2		1		4		5		3		4	2	4	2					6		20	4
	f.	1		1						6		10		29		14		12		5		2				8		72	
Measles,	m.	5	1	16	2	21	1	8				2														50	4	2	
	f.	4	2	8	3	13	1	9	1																	34	7		
Hydrothorax & Hæmoptoe,	m.							1	1					5	1	8		7	2	7	2	1				1	1	28	5
	f.											1		3		11		4	1	4	1							21	2
Pneumonia,	m.	27	6	30	9	28	2	10		8	1	21		32	1	49	3	28	3	28	5	22	2			103	18	180	14
	f.	17	6	24	4	20	2	12		5		24		64	3	56	1	54	1	31		10	1	5		78	12	244	6
Peritonitis,	m.					3		2		2		1		6		3		3	1	3	1	2	1			7		18	3
	f.					1		6		1		11		27	2	20	3	5		1		2				8		66	5
Paralysis, Mania, & Melanch.	m.	2		1		2		1		2		1				3		10	1	3		4				8		21	1
	f.			2		2		1		1		2		5		13		8		4		7		4		6		42	
Phthysis,	m.					1	1			1		1		17	2	16	5	6	4	2	2	2	1			2	1	44	14
	f.									2		7	4	24	10	29	11	19	9	10	1	2				2		91	35
Phrenitis,	m.	6	2	8		12	4	8		1		5		7		6	1	3	2							35	6	21	3
	f.	3	1	3	1	5	2	9	3	6		4		4	1	11	1	4	1	2	2					26	7	25	5
Pertussis,	m.	2		2		5	2			5	1															14	3		
	f.			1	1	8	1	1		4						1										14	2	1	
Rheumatism,	m.			1		1		3		4		8		20		28		23	1	14		4		1		9		98	1
	f.							2		5		17		39	1	36		18		13		10				7		123	1
Scarlatina,	m.					3		3		4		1														10		1	
	f.					6	1	8		3		2		2				1								17	1	5	
Variola,	m.	4		5	1	9	4	3	1	2	1	2		1												23	7	3	
	f.	1	1			8	1	2		2																13	2		

Notes on the foregoing Table.

I have assumed the age of 15 to be the average period of puberty in this climate. It is also assumed that the several periods herein marked are fair proportional sections of life as to their liability to disease.

Anasarca is more prevalent in the adult, as 196 is to 50, or nearly as *four* to *one.* This proportion is obtained by the rule in page 272, (Vol. xxxi.) taking 6 : 1179, the total of the young, with 50 : 2526, the total of adults. It is of high relative mortality in the young, probably as being always symptomatic and secondary on serious internal disease. The most diseased age is from 50 to 60; the most mortal *absolutely* from 20 to 30; the most mortal *relatively* from 40 to 50.

Ascites. Inasmuch as the total of the adults is double that of the young, it is requisite to double the number of the young in the several sections of the columns of totals in this table, in order to find the exact ratio, *e. g.* in the present genus, $6 \times 2 = 12$ to 26. Ascites then is chiefly a disease of adult life, but rather more mortal in the young, namely, as 2.8 is to 2. This may happen from delicacy of tissue in the young, in consequence of which the ravages of disease are ill repaired; except, indeed, in the case of surgical maladies from external violence, in which reparative action in the young is wondrously luxuriant. The most diseased age is from 30 to 40.

Asthma or *Dyspnœa* is nearly four times more frequent in the adult than in the young, and it is also more mortal. It is more mortal in the adult male than in the female. The most diseased age is from 50 to 60; the most mortal from 40 to 50.

Apoplexy is almost entirely a disease of the adult, for the slow and gradual *coma* which is the sequel of phrenitis or encephalitis in the young is not exactly apoplexy, which term I confine to the instantaneous disease. It is singularly more mortal in the male than in the female.

Carditis is three times more prevalent in the adult than under puberty. Its high relative mortality in the young shows how much the rapidity of the pulse, which is characteristic of this age, affects the progress of diseases of the heart. The most diseased age is from 40 to 50; the most mortal relatively is from 30 to 40.

Convulsions are eight times more prevalent in the young; and more mortal in the female than the male child, from her greater sensibility and irritability of texture. The most mortal and diseased age is the first year.

Catarrh is of much greater frequency and mortality in the young. The most diseased and mortal age is the first year.

Enteritis is nearly three times more frequent in the young: of nearly equal mortality in the young male and female, but more mortal in the adult male, as 10 to 7. The most diseased and mortal age is from two to five.

Cholera, Dysentery, and Diarrhœa are three times more prevalent in the young; less prevalent but more mortal in the young female than in the male. In these relations it accords with *Catarrh*, showing that mucous diseases have a particular alliance with the age of childhood and the female sex. It is, however, less mortal in the adult female than in the male, as 27 to 9. The first year is the most diseased and mortal age.

Dyspepsia is almost entirely a disease belonging to adult life;—of course the instances of innocent vomiting so frequent in sucking children are omitted. The most diseased age is from 30 to 40.

Epilepsy is more than twice as frequent in the adult as in the young. This genus is far less connected with disease in the brain in the adult than in the young, from the more vivid sympathy which exists among the several parts of the nervous system in the latter class. Hence its low mortality. The most diseased age is from 20 to 30.

Erysipelas is very little incident to the young. The most diseased age is from 30 to 40.

Fever is of considerable prevalency in the young; but that the majority of fever cases happens in them I presume to be an error. Probably many cases here marked fever belong truly to the genera *gastritis* and *enteritis erythematica*. It is of much smaller mortality in the young than in the adult, which I think shows the close connexion of fever with the *nervous system*, the disorders of which are much augmented by the extreme exhaustion of this system by the labours and cares of adult life. It is more mortal in the young female than in the male, as 77 to 27; but less mortal, though more prevalent, in the adult female, as 21 to 9. The most diseased and mortal age is from 20 to 30.

Gastritis is a little more prevalent, but far less mortal in the adult than in the young; and far more mortal in the young female and the adult male. The most diseased age is from 20 to 30.

Hepatitis and *Icterus* are three times more prevalent in the adult than in the young; doubly more prevalent, but far less mortal, in the adult female than in the adult male. The most diseased age is from 20 to 30.

Measles is nearly altogether a disease of the young. The most diseased age is from two to five. The most mortal is the second year.

Hydrothorax and *Hæmoptoe*.—There is here indicated too small a proportion in the young, from defect in the journals. The most diseased age is from 30 to 40; the mortal from 40 to 50.

Pneumonia is only a little less prevalent in the young than in the adult, namely as 5 to 6.5. It is less mortal in the latter.

It is more prevalent as well as mortal in the young male than in the female. Its rate of prevalency in the adult female and adult male is as 10 to 6; its rate of mortality in them as 13 to 40. The most diseased age is from 30 to 40, and most mortal age from 50 to 60.

Peritonitis is three times more incident to the adult than the young: far more mortal, but far less prevalent, in the male than in the female. The most diseased age is from 20 to 30; the most mortal from 30 to 40.

Paralysis, *Mania*, and *Melancholia* chiefly belong to adult age: are more mortal in the male; and the most diseased age is from 40 to 50.

Phthisis seldom occurs below puberty, being here sixteen times more frequent in the adult. The high irritability of the lungs in children does not admit of the tardy process of ulceration before the fatal issue. Effusion or gangrene destroy in the acute state of pulmonary diseases. The most diseased and mortal age is from 30 to 40. Yet Cullen places it earlier. It is very prevalent from 20 to 40.

Phrenitis seems to be nearly three times more prevalent in the young than in the adult. It is more mortal in the young female, but less prevalent. It is more mortal also in the adult female, from the facility of effusion or extravasation in her system, the proportion being 7 to 5. The most diseased and mortal age is from two to five. The most diseased age in adults is from 30 to 40.

Pertussis.—Only one of thirty-one cases occurred beyond the age of puberty. It is rather more frequent in the female, but more mortal in the male. The most diseased and mortal age is from two to five.

Rheumatism chiefly belongs to adults. The most diseased age is from 30 to 40.

Scarlet-Fever occurs much oftener beyond the age of puberty than measles or hooping-cough. The most diseased age is from 5 to 10.

Variola.—Only six of the cases occur after puberty. It is both more frequent and more mortal in the male than in the female. The most diseased and mortal age is from two to five.

The diseases which appear from this table to be chiefly prevalent in the young of both sexes are convulsions, catarrh, enteritis, cholera with diarrhœa, fever (?) measles, phrenitis hydrocephalica, pertussis, scarlatina, variola;—that is, the diseases of the brain, skin, and mucous membranes. These are ascertained by adding *one-third* of the combined amount of young and adult under particular diseases to the section of young, being the difference in the aggregate of these classes.

The diseases of greatest *absolute* mortality in the young are, convulsio, catarrh, enteritis, as 16 to 7. Cholera and diarrhœa as 15 to 10; gastritis 4 to 3; measles and pneumonia as 38 to 20; phrenitis as 16 to 8; pertussis, scarlatina, variola.

In comparing the numbers in the above sections of the young and adult, a sixth of the combined amount of mortality under particular diseases is to be added to the column of deaths in the young, being the difference in the aggregate of mortality in these classes.

The diseases of highest *relative* mortality in the young are anasarca as 7 to 3, carditis as 8 to 4, enteritis as 8 to 5.7, gastritis as 39 to 17, hydrothorax and pneumonia 21 to 6, phrenitis as 5.7 to 4.7. It seems, from a comparison of these orders of the frequency and mortality of particular diseases in the young, that the beautiful principle of compensation adverted to in page 287, (Vol. xxxi.) is violated with respect to these.

TABLE III.

In this table the diseases of table second are arranged in natural classes, according to their situation in different vital organs; and their frequency and mortality are distinguished in each sex and in both sexes conjunctly, and at different ages.

Diseases of	Sex.	1st year.		2d year.		to 5.		to 10.		to 15.		to 20.		to 30.		to 40.		to 50.		to 60.		to 70.		above 70.		Under puberty.		Above puberty.		All ages.	
		S.	D.	S.	D.	S.	D.	S.	D.	S.	D	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	D.	S.	.D	S.	D.
Brain,	*m*	15	2	15	2	18	2	10		5		11	2	16	1	13	2	15	4	5	1	6	1	1		63	6	67	11		
	f	8	4	9	2	8	2	12	3	10		10		18	1	28	1	13	1	8	3	7		1		47	11	85	6		
	bo	*th*	*se*	*xe*	*s.*																					110	17	152	17	262	34
Lungs,	*m*	47	5	45	10	38	3	17	1	11	1	25		66	4	89	9	51	9	57	12	42	5	15	2	158	20	345	41		
	f	45	9	36	4	30	2	19		17		41	4	108	13	118	13	97	11	65	3	25	2	15	3	147	15	468	49		
	b																									305	35	813	90	1118	125
Stomach,	*m*	9		10		10		7		3		7		27		34		25		15	1	13	2	1		39		122	3		
	f	8	1	8		4	1	4	1	11		23		94	1	100		96		54		27		9		35	3	403	1		
	b																									74	3	525	4	599	7
Intestines,	*m*	48	5	57	2	36	4	19	2	8		6		21	2	22	1	18	1	5	1	7		3	1	168	13	82	6		
	f	36	2	38	3	22	5	17		10	1	19	2	41	2	40	2	27	1	12		5		1		123	11	145	7		
	b																									291	24	227	13	518	37

This table contains the totals of those cases whose ages were distinguished, but not all the cases of Table I.

In combining or contrasting the statistical registers of different observers, it is requisite to form such natural classes of diseases as is done in this table, since greater precision may be thereby obtained; and there is more certainty that the same things are compared, than in combinations of particular diseases distinguished according to the genera of Cullen. From the table now given, the following conclusions may be drawn as to the relative frequency and mortality of the above classes of diseases in the young compared with the adult, the male with the female, the young male with the young female, the adult male with the adult female.

Diseases of the Brain are highly prevalent in the young, being to the proportion in the adult as 197 to 152; and also more relatively mortal, as 9 to 7. They are more prevalent in the young male than in the female, as 63 is to 57, but less relatively mortal, as 10 to 4.2. They are more incident to the male sex than the female, as 182 is 132, but of equal mortality in both sexes. Their relative frequency in the adult male to the female is as 117 to 85; their relative mortality as 14 to 6. The most diseased age below puberty is from 2 to 5; the most mortal is the first year. Beyond puberty, the most diseased age is from 30 to 40, the most mortal from 40 to 50.

Diseases of the Lungs are more prevalent in the adult than in the young, as 813 to 677; equal in relative mortality, while the positive mortality is greater in the adult, as 90 is to 55. They are more prevalent in the male sex, as 726 is to 615, and of higher relative and positive mortality also in them. They are a little more prevalent in the young female than in the young male, but more relatively mortal in the young male, as 10 to 7.9. They are more prevalent in the adult male, as 716 to 468; and more relatively mortal, as 9 to 8.4. The most diseased age below puberty is the first year; the most mortal relatively the second year. Above puberty, the most diseased age, and also the age of largest absolute mortality, is from 30 to 40; the greatest relative mortality is from 40 to 50. The strength of the male subject, and his greater exposure, naturally tend to throw on him the pressure of the severer forms of diseased lungs.

Diseases of the Stomach seem to be nearly *three* times more incident to the adult than to the young, but more relatively mortal in the latter, as 130 to 25; and of nearly the like proportion as to frequency in the female sex beyond the male, but more relatively mortal in him, as 110 to 53. They are relatively far more mortal in the young female than in the young male, and in the adult male than in the female, as 403 to 40, but nearly *doubly* more *frequent* in the adult female. Her delicate frame is less able to repel disease, and his is more apt to sustain organic injury. The most diseased age is from 30 to 40, when the cares and pleasures of life are suffered and enjoyed in their acme.

Diseases of the intestines are *doubly* more prevalent in the young than in the adult, and relatively more mortal, as 17 to 12. They are more prevalent in the male sex, as 360 to 268, and of higher relative mortality in him also. They are somewhat more frequent in the young male, but relatively more mortal in the young female, as 13 to 11. This proportion is reversed in the adult sexes, the relative mortality in the male being 1 in 14, in the female 1 in 20.7. The most diseased age in childhood is the *second* year, but the first is the most mortal; the most diseased and mortal adult age is from 20 to 30.

The diseases of the lungs are here seen to be by far the largest class, being in frequency equal to those of the stomach and intestines together. In absolute mortality they fearfully surpass all the other classes combined, amounting to nearly one-half of all the deceased. The diseases of the brain, however, exceed the other classes in relative mortality; and if some of the deaths from fever be added here, which it would be pathologically correct to do, the absolute mortality of this class would be second only to that of the first.

TABLE IV.

This table shows the relative frequency and relative mortality of the foregoing diseases collectively, in the two sexes and at different ages.

Age.	Sex.	Number.		Mortality, one in	Age.	Sex.	Number.		Mortality, one in	Age.	Sex.	Number.		Mortality, one in
		Sick.	Dead				Sick.	Dead				Sick.	Dead	
1st year,	*m*	137	15	9	to 20,	*m*	87	4	22	to 70,	*m*	78	11	7
	f	106	18	6		*f*	179	10	18		*f*	85	4	21
	both	243	33	7		*both*	266	14	19		*both*	173	15	11.5
2d year,	*m*	161	17	9.5	to 30,	*m*	193	9	21.4	above 70,	*m*	25	4	6.2
	f	113	14	8		*f*	412	28	14.7		*f*	33	4	8.2
	both	274	31	9		*both*	605	37	16.3		*both*	58	8	7.2
to 5,	*m*	161	22	7.3	to 40,	*m*	215	17	12.5	total under puberty.	*m*	628	64	9.8
	f	122	15	8		*f*	389	24	16		*f*	539	56	9.6
	both	285	37	8		*both*	634	41	15.4		*both*	1167	120	9.7
to 10,	*m*	106	7	15	to 50,	*m*	154	21	7.3	total above puberty.	*m*	865	85	10.2
	f	108	5	21.6		*f*	300	17	18		*f*	1567	91	17.2
	both	214	12	18		*both*	474	44	11.5		*both*	2432	176	13.8
to 15,	*m*	63	3	21	to 60,	*m*	114	19	6					
	f	90	4	22.5		*f*	169	4	42					
	both	153	7	22		*both*	301	26	11.6					

The total sick in the first ten years of life is 1016, and the deaths 113, or the relative mortality as 1 in 9. The total sick below puberty is 1167; the deaths 120, or 1 in 9.6. In the second ten years the sick are 419; the deaths 21, or 1 in 20. The total sick after puberty is 2432; the deaths 176, or 1 in 13.8. The grand total sick 3599; deaths 296, or 1 in 12.2. It is necessary to remark here again, that this ratio indicates that every twelfth attack of disease contributes its share to mortality; not that one in twelve of the sick actually died: the number of persons diseased being about 5300, and the deaths 285; the relative proportion of which is 1 in 18.6.

The greater vigour acquired in the second year of infancy easily explains its inferior rate of mortality compared with the first; while the greater exposure of the child in the next three years makes the relative mortality of this period somewhat higher than the second. In the fourth period a vast accession of vigour has been acquired by the body; still more in the halcyon days of youthful vivacity and freedom from care, about the age of puberty. Indeed the character of fresh vigour and slight exposure is spread over the second decade of life. The third and fourth decades indicate great exposure, with the pressure of toil and care, mitigated, however, in their ravages by the conservative powers of confirmed manhood. The fifth decade sadly shows how quickly the energies of the body are subdued by the curse which enshrouds our human condition; and the iron age of decrepitude has begun. The column of the distinct sexes well exhibits the greater delicacy of the female frame, even in the first two periods of life, when the exposure of both sexes may be supposed to be equal. In the third and fourth periods the more daring exposure of the boy surmounts the influence on the production of disease of greater delicacy in the female, and makes the rate of mortality in him surpass that in her. In the fifth period the vigour of the male competes with the more sheltered lot of the girl, and equalises their rates of mortality. From 15 to 20, and 20 to 30 a striking disparity is manifest. Her new sympathies and finer sensibility now render her pre-eminently obnoxious to disease and death. In the fourth and fifth decades, also, she retains the lead in the entail of disease; but the harder toil of the male, through the whole of the residue of life, fixes on him the pressure of paramount mortality.

TABLE V.

General Conspectus of the Diseases of Plymouth arranged in anatomical and nosological clauses.

		Diseases.	Numbers of		Frequency, one in	Relative mortality, one in	Absolute mortality, one in
			Sick	Deaths			
Class I.	1.	Brain and Spine,	331	47	17	7	6
	2.	Heart and Lungs,	1204	139	4.7	8.7	2
	3.	Abdomen,	1893	88	3.	21.5	3.2
	a.	Stomach,	781	17	7.3	46	17
	b.	Intestines,	859	47	6.6	20.4	6
	c.	Liver,	104	4	54.6	26	71
	d.	Urinary Organs,	105	3	54.6	35	95
	e.	Female Genital Organs,	155	2	36	77	142
	4.	Skin,	558	25	10.2	22.3	11.4
Class II.	A.	Mucous Membrane,	2520	123	2.3	20.5	2.3
	B.	Serous Membrane,	673	80	8.4	8.3	3.5
	C.	Glands,	388	19	14.7	20.4	15
	D.	Fibrous, and Muscular Texture,	313	3	18.4	104	95
Class III.	1.	Febres,	400	19	14.2	21	15
	2.	Phlegmasiæ,	1957	131	2.9	15	2.2
	3.	Exanthemata,	268	24	21.2	11.2	12
	4.	Hæmorrhagia,	287	53	20	5.1	5.4
	5.	Profluviæ,	224	4	25.6	55.5	71.2
	6.	Adynamiæ,	501	6	11.2	83.5	47.5
	7.	Comata,	82	12	69.3	7	24
	8.	Spasmi Animales,	83	10	69	8.3	28.5
	9.	Spasmi Vitales,	168	18	33.8	9.3	16
	10.	Spasmi Naturales,	469	19	12.1	24.7	15
	11.	Ordo Spasmi,	726	47	8	15.3	6
	12.	Intumescentiæ Hydropes	105	28	54	4	10.2
	13.	Intumes. Solidæ,	40	3	142	13.3	95
	14.	Impetigines,	126	4	45	31.5	71.2
	15.	Epischeses,	236	4	24	59	71.2
	16	Tumores,	137	7	42	19.6	40.7
	17.	Dialyses,	185	1	30.8	185	285

Note.—In No. 1. of Classification I. the milder diseases, as cephalæa, and vertigo, are excluded. No. 3. b. is exclusive of diseases of the peritoneum, except when the functions of the intestines were much disordered. In No. 3, the genital organs are omitted. In Classification II. I rank the whole of dyspepsia, peripneumonia, and phthysis, with profusions and suppressions of blood and other humours. B. Comprises disease of the parenchymatous textures beneath a serous membrane, *e. g.* as in splenitis. In C. diseases of some mucous and serous membranes are separated, as cynanche tonsillaris, and hepatitis. In Classification III, 12. hydrocephalus is excluded, being comprised under phrenitis.

Notes on Table V.

Classification First.—The high relative mortality of diseases of the brain and thoracic organs shows that their affections are for the most part organic,—that is, they consist in some palpable derangement in the actions of the blood-vessels, allied to inflammation with its consequences. This is more particularly true of the thoracic organs, (for the brain or head has a large portion of innocuous disorder,) whose diseases arise from violence or exposure to inclement seasons, from which external causes the brain is shielded by its osseous envelope. Its security, however, in this respect is counteracted by the injurious effect of this very structure on its blood-vessels and substance, when the circulation in it, as to its relative quantity or velocity, is disturbed. Morbific causes, likewise originating or subsisting within the body, such as the passions of the mind, and the various aliments of sensual pleasures, are substituted for those external causes to which other parts of the frame are chiefly exposed.

The abdominal organs are more the subjects of functional derangement, and exhibit a lower rate of relative mortality, because their functions are not so directly and closely essential to life as those of the heart, lungs, and brain. Hence a brief disturbance of those functions is not so certainly and instantly followed by organic disorder as in the case of the more vital organs ; and the habit of sustaining a perpetual variety of impressions strongly tends to deaden the sensibility of those parts, and consequently their susceptibility of disease. Should we not refer to this wonderful influence of habit the greatly inferior relative mortality of diseases of the stomach to those of the intestines ?

The high relative mortality of the acute diseases of the skin evinces its high rank as an organ of sense ; for its immediate function is remotely connected with vitality, and even its suspension is more or less obviated by the vicarious labour of the lungs. This mortality, then, can only be ascribed to its high sensibility and its sympathy with other organs. It is curious that the positive mortality of this order should so greatly surpass that of the stomach.

The relative frequency of diseases of the head, chest, and belly, seems to show that inclement seasons make more disease than the intemperate habits of mankind. The absolute mortality of the diseases of these three grand departments of the body indicates that more deaths happen under the form of acute inflammation than of any and all other modes of disease. Nevertheless, a large proportion come under the forms of ulceration and obstructed circulation, the effects or sequelæ of inflammation, more particularly in the lungs and brain.

Considering that the structure of the brain is but ill adapted for the natural subsidence of disease, the small relative mortality of its diseases strongly evinces the powers of medicine.

The large proportion of cutaneous disorders, which consist chiefly of chronic affections, shows the morbid productiveness of filthiness, bad food, and inadequate clothing. Sailors are particularly liable to this genus.

CLASS. SECOND.—The large proportion of diseases of the mucous membranes will show the importance of studying attentively the habits and condition of mankind, which are very prominent causes of these affections.

The low relative mortality of the diseases of this texture evinces how greatly secretion tends to resolve disease, although this proportion should in part be ascribed to the fine sensibility of the texture, whereby a large portion of the cases are early developed in a mild form, and induce a speedy resort to medicine. Under this group are included the greater number of Cullen's order *Spasmi*, which, being seldom combined with serious disease in the blood-vessels, are for the most part innocuous.

The high relative mortality of diseases of the serous membrane is to be referred to the infelicity of this texture for the sustaining or resolving of disease, and to its close connexion with the important organs which it invests, whence the natural process of effusion, which relieves inflammation, but at the same time impedes some vital function. The medical treatment of this order is generally well understood.

The low relative mortality of glandular diseases well shows how much acuteness or obtuseness of the vital properties of a part, as well as the facility or difficulty of excretion, affects the result of its diseases.

CLASS. THIRD.—Cullen is of immense value as a guide to the observation of Physicians ; for, although his Nosology is not a natural classification of diseases, the several genera of his classes possess many real affinities which are of utility in directing the appropriate method of cure.

The inferior relative mortality of *fevers* to that of the *phlegmasiæ* is a presumptive proof that something more than inflammation, or different from it, subsists in them.

Inflammation is a vast element in the condition of disease. They, however, alike err who make either this or nervous disorder exclusively the grand principle of diseases.

It is greatly to be lamented that the mortality of the *exanthemata*, many of which are more within the domain of preventive medicine than those of any other class, should still be so large.

The proper *hemorrhagies* are of low relative mortality. A beautiful and wonderful power exists in the animal economy of repairing and renewing the vital fluid.

The low mortality of the *profluviæ* again displays the power of secretion in the relieving of disease.

Diseases of debility without organic affection are here seen to be little dangerous. This shows what should engage the chief care of the physician,—the subduing the inordinate vascular actions in disease.

The low mortality of the *spasmi naturales* illustrates the powers of medicine when not resisted by infelicity of anatomical structure in the diseased parts.

Dropsy is seen to be a very serious disease.

The collating of the profluviæ and epischeses shows that the excessive retention or profusion of matters which should be excreted is of nearly equal peril to life.

The exanthemata, impetigines, and dialyses compared, exhibit a wide difference in the relative mortality of acute and chronic cutaneous diseases.

The phlegmasiæ and spasmi when collated evince that inflammatory and spasmodic diseases, technically so called, are of nearly equal relative mortality. The mortality of the latter arises, however, not from simple disturbance of the nervous functions alone in the spasmodic affections, but of the sanguiferous function also, more particularly in the brain and lungs; the relative mortality of the spasmi *animales* being threefold, and that of the *vitales* more than double the proportion of the naturales.

TABLE VI.

In this table are exhibited the variations in the relative frequency and mortality of diseases at Plymouth at two different periods, with an interval of twenty years, viz. from 1799 to 1805, and from 1823 to 1826 inclusive. In the latter period I have stated the results among Dispensary patients apart from those occurring in my own practice, and have also given the results of both collectively, under the head of general patients. In the early period the total number of cases was 4010, the deaths 321. In the latter period the total dispensary patients were 2012, the deaths 112; and the general patients were 5648, the deaths 285. In the nine last columns each figure is the second term of a ratio of which the first term is always unit.

Diseases.	Positive Numbers.						Relative Frequency.			Relative Mortality.			Ratio of deaths to total deaths.		
	1799 1805		1823 to 1826.				1799 1805	1823—6.		1799 1805	1823—6.		1799 1805	1823—6.	
			Dis. pat		Gen. pat.			Disp.	Gen.		Disp.	Gen.		Disp.	Gen.
	S.	D.	S.	D.	S.	D.									
Anasarca, Ascites,	112	13	24	6	87	21	36	83.8	65.3	9	4	4	24.7	19	13.5
Asthma, Dyspnœa, Hydrothorax,	252	21	105	12	143	20	16	20	40	12	9	7	15.3	9.3	14.2
Apoplexy, Paralysis,	52	10	23	3	70	9	77	87.5	81.2	5.2	7.6	8	32	37	32
Carditis, Angina, Syncope, Palpitatio,	6	1	3		48	7			118.4			7			40.7
Cynanche, Trach. and Lar.	2	1	3		33	6			172.2			5.5			47.5
Convulsio, Epilepsy, Chorea, Tetanus,	55	5	28	1	85	10	73	72	66	11	28	8.5	64	112	28.5
Catarrh, *	282	1	36		191	3	14.6	56	30	282	36	63.6	321		95
Cholera, Diarrhoea,	297	10	101	9	354	18	13.5	20	16	29.7	11.2	18	32	12.4	16
Dyspepsia, Asthenia, Hypochondriasis, Pyrosis,	369		274	2	499	3	10.9	7.3	11.4	369	137	166		56	95
Dysentery, Peritonitis, Enteritis,	8	1	33	2	283	31	501	61	20	8	11	9.1	321	37	9.2
Erysipelas,	11		19	1	30	3	364	106	189.5	11	19	10			95
Gastritis, †			12		177	6			32			29.5			47.5
Hepatitis, Icterus,	30		38		104	4	133.7	53	54.6			26			71
Measles,	71	6	40	5	88	11	56.4	50.3	65	12	8	8	53.5	22.4	26
Pneumonia,	138	22	279	19	615	53	30	7.2	9.2	6.2	14.7	11.6	15	6	5.4
Phthysis, Hæmoptoe.	225	77	78	17	176	51	18	26	32	2.9	4.6	3.4	4.1	6.5	5.6
Phrenitis, Hydrocephalus,	9	4	16	6	108	25	445	125.7	52.6	2.2	2.7	4.3	80.2	19	11.4
Pertussis,	60	9	9	1	31	5	67	224	174	6.6	1.9	6.2	36	112	57
Scrofula,	72	9	45	4	78	2	56	45	73	8	11	39	36	28	142
Synochus, Typhus, ‡	487	56	250	9	400	19	8.2	8	11.7	8.7	28	21	5.3	12.4	15
Scarlatina,	63	5	12		33	1	63.6	168	172.2	12.6	12	33	64.2		285
Variola,	112	46	21	7	37	9	36	96	154	2.2	3	4	7	16	31.6

The diseases which have risen at the Public Institution in relative frequency during this interval are, Dyspepsia and its collaterals Enteritis and analogous diseases, Erysipelas, Hepatis and Icterus, Measles, Pneumonia, Phrenitis, Scrofula, Febris. Those which have risen in relative mortality: Asthma, &c., Catarrhus, Cholera and Diarrhœa, Dyspepsia, and the like, Measles. Those which have risen in positive mortality are, Anasarca, Ascites, Asthma and Hydrothorax, Cholera, Dyspepsia, Enteritis, &c., Measles, Pneumonia, Phrenitis, &c. Scrofula.

The diseases which seem to have risen in relative frequency

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* Dr Woolcombe's *Catarrh* includes Influenza; and the recent Dispensary observers place many cases of Catarrh under Pneumonia.

† Eleven of the twelve Dispensary cases were fever complicated with Gastritis.

‡ Cases of infantile remittent fever are comprised here in both periods.

in the town at large during the above interval are Carditis, Cynanche, Convulsions, Epilepsy, and the like, Enteritis, Dysentery, and Peritonitis, Gastritis, Hepatitis, Erysipelas, Pneumonia, Phrenitis. Those which have increased in relative mortality are, Anasarca, Asthma, Convulsions, Catarrh, Cholera, and Diarrhœa, Dyspepsia, Dysentery, and Enteritis, Erysipelas, Hepatitis, and Icterus, Measles, Chincough. Those which increased in positive mortality are, Anasarca, Asthma, Carditis, Cynanche, Convulsions, Catarrh, Cholera, Dyspepsia, Dysentery, Erysipelas, Gastritis, Hepatitis, Measles, Pneumonia, Phrenitis.

It may be questioned how far the register of a public institution is an exact criterion of the proper endemic diseases of a place, since the description of its applicants will be determined by various local circumstances; and in no two places or institutions will the class of patients be similar. The same may be said of the patients of individual physicians. Thus the proportion of subjects of particular diseases which have come under the author's notice are seen from the columns in the first table to differ greatly from the subjects of the Dispensary practice. A complete view of the diseases of a district can therefore only be exhibited by combining the observations of all its medical practitioners. The above variations, therefore, are presented as only presumptively approximating to the truth, which, it is hoped, more extended inquiries will substantiate. Those tables, however, the writer presumes to believe, exhibit as accurate a view of the rise and fall of particular diseases among the lower orders in Plymouth as the circumstances of the inquiry admit of; Cullen's Nosology having been made the ground work of diagnosis by the physicians in the periods which are herein compared. The basis of the consequent deductions from those tables is the postulate, that the relative proportion of one disease to the total of miscellaneous diseases in any one period is fairly comparable with the relative proportion of that same dissease to the whole number of diseases at another period; and that when the whole numbers in the several periods are equal, the rate of variation educed is the exact measure of the increase or decrease of particular diseases. And that even when the whole numbers are unequal, if they consist of a large amount of miscellaneous cases, or embrace a period large enough to comprise the average incidence of diseases, the proportions of the component diseases are measures of real variation in different periods.

Notes on Table VI.

Anasarca and ascites are now less common, because inflammatory affections being earlier and more skillfully treated, now far seldomer end in dropsy than formerly.

Asthma, &c.—The variation here is to be referred to a difference of arrangement by Dr Woolcombe and the recent Dispensary observers; some cases of chronic pulmonary disease having probably been arranged by the latter under pneumonia, which term Dr Woolcombe more correctly makes to include only the acute diseases of the lungs.

Apoplexy, &c.—Is not the pathology and cure of apoplexy better understood now than formerly? whence its fall in relative mortality, &c.

The great increase of *carditis* arises from the attention of physicians being more directed to the heart since the publications of Corvisart and Laennec.

The fall in the relative mortality of *convulsio* is to be ascribed to the advancement of the art of medicine.

Catarrh.—Influenza, which in the year 1803 was epidemic throughout the kingdom, has not revisited us.

The fall of *diarrhœa* in frequency may be ascribed to the improved habits and habitations of the poor; the increased frequency and mortality of cholera to the intense heats of late summers.

Dyspepsia is increased by a greater proportion of the poor being employed of late years in sedentary occupations, such as lace and carpet weaving, and millinery.

Dysentery, &c. are imperfectly discriminated in Dr Woolcombe's Reports, although very common in Huxham's time.

Erysipelas was very prevalent in Huxham's days. Its decline towards the end of the century, and its recent rise, I am unable to explain.

Gastritis, probably from being a sudden and vehement disease, falls, like the croup, for the most part, under the care of private practitioners.

Hepatitis and *Icterus* were probably imperfectly distinguished formerly, and are now of apparently frequent incidence from the fashion introduced from Indian practice of ascribing dyspepsia and other abdominal diseases to liver complaint, without satisfactory evidence.

The increase of *measles* in frequency and relative mortality, I ascribe to a law of Divine Providence, which seems to require the termination of nearly one-third of its creatures in the period of infancy. This variation, however, is accordant with the rise in pulmonic diseases, and may result from the same natural causes.

Pneumonia.—To make the variation more precise, I combine this genus with *Catarrh* in the two periods, which will comprise all the acute proper diseases of the lungs. We then have in the former period 420 cases, with 23 deaths; the relative frequency 1 to 9.7; the relative mortality 1 to 18; the positive 1 to 13.5. In the latter period 315 cases, 13 deaths; the relative frequency 1 : 6.3; relative mortality 1 to 16.4; positive mortality 1 to 6. So that in all these relations there is a fearful increase.

The decline of *phthysis* is, I believe, correct, though it contradicts the elaborate conclusions of Dr Woolcombe's essay in 1807. Nor do we find that the opposition obtains here which Dr Wells has placed betwixt the prevalency of this disease and intermittents, for these have not risen; yet remittent fevers in the young may now be more prevalent than formerly. In order to see the real amount of this variation, all the *chronic* forms of diseased lungs should be combined; as many cases which were fatal in the form of indurated lung would have ended in phthysis had life been prolonged. These were in the former period 477 cases, with 98 deaths; relative frequency 1 to 8.4; relative mortality 1 to 4.9; absolute mortality 1 to 3.2. In the latter period 183 cases and 29 deaths; relative frequency 1 to 11; relative mortality 1 to 6.3; positive mortality 1 to 3.8. That is, in all these relations there is a decline, which I refer to the present more general habit of early resort to the aid of medicine among the poor. Is this recent transference of the pressure of mortality from phthysis to pneumonia to be ascribed to changes in the seasons, to a better use of medicine, or to a decline in scrofula, with better habits in the community? Possibly the *active practice* now in vogue may have contributed to some deaths in the form of pneumonia, which would have otherwise ended as phthysis.

Hydrocephalus and *Phrenitis.*—Has not scrofula shown itself more under this form of late years? Many of those infants who have been rescued from the small-pox have only survived to become the prey of this fatal disorder.

As *hooping-cough* prevails at uncertain and often remote periods, the variation in relative frequency indicated by the table admits of no deduction; and the paucity of deaths in the latter period may be apparent only, some fatal cases being probably placed under pneumonia.

It is curious that at such an interval of years *fever* should be so nearly equal in prevalency. Its vast decline in relative mortality arises from the better habitation and habits of the poor.

Scarlet-fever admits of the remark made under Pertussis. The years of the latter period are too few to comprehend its average epidemic prevalency.

Variola has certainly assumed a more lenient form since the use of vaccination. Its decrease in relative frequency is more than fourfold, and in relative mortality nearly twofold. Is not this a proof that the fatal virulence of its contagion is augmented directly as the square of its quantity, even to an unlimited progression ; and that the cow-pox, even though it have failed to exclude its invasion, has truly disarmed it of its destructive powers.

TABLE VII.

Conspectus of the diseases contained in the general register from 1823 to 1826, arranged in natural groupes, as affecting the same organs or textures, compared with those of the Dispensary alone for the period from 1799 to 1805.

	Diseases.	Numbers.			
		1799 to 1805.		1823 to 1826.	
		Sick.	Dead.	Sick.	D.ad.
Brain and Spine.	Apoplexy, . .	12	10	17	9
	Convulsions, . .	9	3	35	10
	Chorea, . . .	10		18	
	Epilepsy, . .	35		1	30
	Mania. Melancholia, .	3		30	1
	Paralysis, . .	40		53	
	Phrenitis. Hydrocephalus	9	4	108	25
	Total, .	118	18	291	45
	Relative frequ.*	37.3		19.5	
	Relative mort.	6.6		6 4	
	Positive mort.	18		6.3	
Including Cephalæa & Vertigo.	Total No.	164	18	536	45
	Relat. freq.	24.9		10.5	
	Relat. mort.	9		11.9	
Stomach.	Gastritis, . .			177	6
	Hæmatemesis, .	7		16	1
	Dyspepsia. Pyrosis, .	369		499	3
	Total, .	376		699	10
	Relative freq.	11		8.4	
	Relative mort.			69.2	
Intestines.	Cholera, . . .	41	1	87	5
	Colic. Worms. Obstipation. Hemorrhois,	135	1	170	2
	Melaena, Diarrhœa, Prolapsus ani, .	262	11	267	13
	Dysentery, . .	7		31	1
	Enteritis. Peritonitis.	2	1	252	30
	Hernia, . . .	11	2	14	
	Tabes mesenterica, .	31	9	32	6
	Tympanitis, . .	3	2		
	Total, .	492	27	853	57
	Relative freq.	9		7.8	
	Relative mort.	18.2		15	
	Positive mort.	12		5	

	Diseases.	Numbers.			
		1799 to 1805.		1823 to 1826.	
		Sick.	Dead.	Sick.	Dead.
Lungs.	Asthma, .	13	1	128	13
	Catarrh, . .	182	1	191	3
	Dyspnœa, .	229	16		
	Hydrothorax, .	10	4	15	7
	Hæmoptysis, .	27	2	39	1
	Phthysis, . .	198	75	137	50
	Pneumonia, .	148	22	615	53
	Total, .	807	121	1125	127
	Relative frequ.	4.9		5.1	
	Relative mort.	6.7		8.7	
	Positive mort.	2.6		2.3	
Exanthemata.	Erysipelas, .	11		30	3
	Measles, . .	71	6	88	11
	Scarlatina, .	63	5	33	1
	Variola, . .	112	46	37	9
	Varicella, .			10	
	Purpura. Pompholix. Urticaria, .	12		12	
	Total, .	269	57	210	24
	Relative freq.	14.9		27	
	Relative mort.	4.7		9	
	Positive mort.	5.6		12	
Skin Chronic.	Lichen. Strophulus,	6		52	
	Prurigo. Scabies,	76		60	
	Psoriasis. Pityriasis,	23		32	
	Lepra. Ichthyosis,	10		16	
	Ecthyma, Erythema,	14	1	14	
	Herpes. Eczema,	7		40	
	Porrigo. Impetigo,	39		118	
	Total, .	175	1	332	
	Relative freq.	23		17	
	Relative mort.				
	Positive mort.				

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* The numbers indicating the relative frequency and mortality and positive mortality, always indicate the second term of a ratio, the first term of which is unit.

The aggregate of diseases in the latter period being nearly one-half more than in the earlier, the positive numbers in the second section may be greater than in the first, but the ratio to the total smaller, and the particular disease consequently have declined.

Diseases of the Brain and Spine.—To what sad change in the seasons or in the habits of the people can we refer the melancholy rise in affections of the head and the nervous system? And with all the boasted powers of improved medical science, the relative mortality of this direful class of maladies seems to be increased. The prevalence of sedentary habits may explain the rise in cephalæa; that of mania and melancholia must be considered as the result of intemperate passions,—of that restless desire of improving one's condition in life, which allures men to venture within the whirlpool of speculation. In no former age could it be more truly said than of the present, that the pursuit and the abused possession of wealth form the "*Irritamenta Malorum.*" Within a few years, mechanics and petty tradesmen, with other persons of small capital, have largely embarked in this town in the speculation of buildings; the failure of which has involved numerous families in serious embarrassment.

Diseases of the Lungs.—In no instance would the triumph of medicine afford more reasonable exultation to the practitioner, and more cheering hope to the invalid, than in the decline which the table points out in the mortality of the endemic plague of this kingdom, were the present conclusion established by a grander scale of observation.

Diseases of the Stomach.—The habits of the lower classes here are generally temperate, but very sedentary, in a damp breezy atmosphere, than which there is no more powerful cause of stomach complaint. Dr Woolcombe has arranged, I presume, under Dyspepsia, cases analogous to some placed under my gastritis erythematica, according to the improved pathology of recent times. It is well deserving of severe scrutiny, whether, as I believe is the fact, organic diseases of the stomach have not increased of late?

Diseases of the Intestines.—The increase in the inflammatory affections of this class is truly marvellous. Probably some of Dr Woolcombe's cases of diarrhœa are considered in my register as enteritis erythematica; for my proportion of diarrhœa is below his in reference to the general account of disease, while I believe that the remote causes of this variety during the later period have been as abundant as ever. Our diagnosis is certainly advanced in the tribe of latent inflammations of the intestines, particularly of the mucous membrane; and the registers of other physicians, as well as the London bills of mortality, confirm my statement of an actual increase of inflammatory diseases during the last twenty years.

Diseases of the Skin.—Probably these variations are not the true measures of the laws of the invasion of the epidemic exanthemata, as the periods of their rise and subsidence are irregular, and under the operation of circumstances which are little known.

The rise in the chronic cutaneous maladies seems to convey severe censure on the habits of unwholesome living and want of cleanliness among the children of the poor. This increase, however, may be referred to a decline in the acute maladies having left more young subjects for the attack of the former.

In my subsequent communications, I propose to present tabular views of the relative frequency and mortality of diseases at *various places*, with the deductions they supply relative to curative and preventive medicine.

ART. II.—*On the Pathology of the Humours of the Eye.* No. II. By ALEXANDER WATSON, Esq. Fellow of the Royal College of Surgeons, &c.

IN a former communication*, I described cases in which the crystalline lens becomes spontaneously detached from the parts with which its capsule is connected, and in some of which cases it passes into the anterior chamber of the aqueous humour. This displacement of the lens may arise from inflammation of the eyeball disorganizing the anterior part of the membranous tissue of the vitreous humour, by which the lens, losing its support, and becoming detached from those parts which keep it in its place, rolls about in the eye. In this state, when the pupil is sufficiently dilated to admit of it, the lens passes into the anterior chamber. The displacement of the crystalline lens into the anterior chamber may also arise from an injury of the eye, by which its capsule is torn. Likewise, after the capsule has been torn by the needle in the operation of couching, the lens may be accidentally pushed into the anterior chamber; or, after being depressed, it may get into the anterior chamber, by rising into its former situation. The lens, in each of these cases, being loose and unattached, sometimes passes forward into the anterior chamber, when the pupil is sufficiently dilated.

The presence of the crystalline lens in the anterior chamber produces several important consequences. Vision is completely obstructed by the opaque lens filling up the pupillary aperture. The cornea becomes inflamed, opaque, and covered with enlarged red vessels. This inflammation is caused by the lens resting upon it, and producing the irritation of a foreign body. The iris, too, by the contact of the lens upon its anterior surface, becomes inflamed; so that the patient is harassed by the inflamed state of his eye, until complete disorganization and bursting of the eye by ulceration of the cornea, permit the escape of the lens and other humours.

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* See Vol. xxvi. of this Journal.

When the displaced lens is entire, I have never seen its solution effected by the aqueous humour. Of the cases that have come under my notice, I have had an opportunity of watching five for several years, in order to observe accurately this fact, and in none has solution of the lens taken place. When the lens has been broken to pieces, it does gradually dissolve. But though in this case solution of the lens does ensue, it disappears so very slowly in elderly persons, that the eye may be destroyed by inflammation caused by its presence, before its solution is completed.

The removal of the lens from the anterior chamber, when it gets into this situation, is absolutely necessary to the preservation of the eye. This is usually attempted by the extraction of the lens by the incision of the cornea. To this mode of operating there are several very strong objections. 1. The difficulty of making a proper incision upon an eye in a state of inflammation, as the patient can with great difficulty steady the eye or allow it to be touched. 2. There is another difficulty caused by the lens filling up the anterior chamber through which the knife has to pass. 3. The risk of pushing the lens back into the posterior chamber with the knife. 4. The evacuation of the vitreous humour, which is often partly or wholly in a fluid disorganized state, so that it escapes immediately when the incision is made through the cornea.

With great difficulty also, in the accomplishment of the operation and uncertainty in its result, could the lens be broken up for solution in the anterior chamber.

By far the best method of operating in such cases is that which was practised by M. Dupuytren in a case at the Hotel Dieu, where the lens had spontaneously passed into the anterior chamber*, namely, by taking the lens back again through the pupil and depressing it in the vitreous humour by means of a needle introduced posterior to the iris. To this method, therefore, I resorted with the most complete success in one of my cases.

Having noticed several pathological states of the crystalline lens and vitreous humour, which had not been previously pointed out, I now proceed to describe some morbid states connected with the aqueous humour, and the parts which surround it. The following observations, therefore, include several diseased states in which the cornea, iris, crystalline lens, and the aqueous humour are involved.

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* See Biblioth. Ophtalmolog. Vol. i.

Some time ago I described in another place, several morbid states under the denomination of Chronic Inflammation of the Membrane of the Aqueous Humour*. I shall now make a few remarks on those ulcerations of the cornea, which penetrate through that membrane into the aqueous humour.

When ulceration of the cornea penetrates through its whole thickness, it is always to be considered a most unfortunate circumstance for the patient, as it renders the event of his case extremely uncertain. This occurrence gives rise to several derangements of structure, which are highly dangerous to vision.

The first circumstance which takes place, when an ulcer penetrates through the whole thickness of the cornea, is the escape of the aqueous humour. It may escape wholly or partially, according to the size of the opening and other circumstances. If the opening is very minute, the aqueous humour oozes out gradually, and its escape is known by the eyeball becoming soft and flaccid, by the loss of vision, and by the approximation of the iris and lens to the cornea. The vitreous humour, lens, and iris are pressed forwards, by the pressure of the muscles upon the sclerotic coat. If the patient keeps the eye in a state of rest, the whole of the aqueous humour may not escape; and for this reason less escapes through the night than during the day, the pressure of the muscles upon the eyeballs having very little effect upon it during sleep. As the aqueous humour is very quickly regenerated, the eye in the morning seems to have been replenished to its natural state in the course of the preceding night; but by the pressure of the muscles upon the eyeball through the course of the day, the aqueous humour is again, in part or wholly, evacuated.

When the aqueous humour escapes, vision is much impaired —the sight becomes dim and confused, so that by this alone the patient is aware of the escape of the aqueous humour, and of the degree to which it has been evacuated.

The event in cases of this kind is various. If so much of the aqueous humour is evacuated that the iris and lens project forward in contact with the cornea, general inflammation of the eye is induced apparently by the new situation of the displaced parts. This inflammation is often followed by destruction of the eye from the iris having been inflamed. Indeed, I have seen few cases, in which the lens pressed forwards upon the iris, which have escaped destructive inflammation. By soothing and antiphlogistic means, together with absolute rest, the ulceration of the cornea, in the more favourable cases, has healed. The inflammation has abated—the chambers of the aqueous humour have again become replenished and distended—the iris and lens have resumed their natural situation—and, without either adhesion or other disorganization, vision has been restored.

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* See Edin. Med. Chir. Trans. Vol. i., also Treatise on Diseases of the Eye.

In such cases the opening is closed by a thin cuticle forming over the ulcer by the process of cicatrization. In some cases, after this has occurred, the aqueous humour presses forward the thin newly formed membrane or cuticle, and causes it to project from the cicatrix in the form of a small vesicle which gradually enlarges. This vesicle has been erroneously supposed by some to be formed by the membrane of the aqueous humour;* by others, a protrusion of the vitreous humour.† It may continue nearly stationary for months; or it may burst and disappear by the opening in the cornea closing; or it may form a small fistulous opening, through which some of the aqueous humour from time to time escapes.

When the opening through the cornea is of a larger size than that above described, the aqueous humour escapes more suddenly; so that the iris is not only pressed forwards, but a portion of it protrudes through the opening in the cornea. The protruding portion of iris adheres to the ulcerated portion of the cornea, and generally causes a fixed and often contracted state of the pupil, by which vision is considerably impaired, if not completely destroyed. The protrusion of a portion of the iris, in cases of penetrating ulcer of the cornea, before any of the other humours escape, though very injurious to vision, is nevertheless to be considered as rather a fortunate occurrence; for, by the portion of iris which falls forwards and adheres to the cornea, the reparation of the breach in the cornea is effected,—an event which could not otherwise have taken place without a diminution in the size and convexity of the cornea—the evacuation of some of the other humours—opacity of the cornea and ultimate destruction to vision.

When the protruded portion has adhered, the eye gradually recovers by proper treatment. In consequence of the adhesion of the iris to the cornea, the pupil is generally contracted and drawn to one side,—it also becomes of an oblong shape, and immoveable. By this change, if the central part of the cornea is transparent, and the pupil retains a sufficient size, vision is not much impaired, but the eye loses its power of adaptation to different distances. In course of time, the adherent portion of the iris, if small, elongates, and the motions of the pupil gradually return. When the pupil is so much contracted as to destroy vision, an operation for artificial pupil may be afterwards resorted to.

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* Beer, Lawrence, Travers, Demours, and Vetch. † Scarpa.

The cases above described point out several important circumstances which ought to be attended to in treating ulcerations of the cornea.

1. Caustic ought to be very cautiously applied in ulcers of the cornea. For if, by its incautious application, repeated sloughs are formed, an opening will be made through the whole thickness of the cornea, and the eye will be exposed to the destructive changes of structure above described.

2. When a protrusion of the iris takes place from sloughing or ulceration of the cornea, no attempt should be made to replace it into its natural position. It is rather to be considered a fortunate event, as the only way by which the further destruction of the eye may be prevented.

3. This natural process by which a breach in the cornea is repaired may, in some cases where the evacuation of the eye is threatened, be advantageously imitated by art. This might be accomplished by making pressure upon the eyeball, or a small hook might be introduced through the opening in the cornea, with which a portion of the iris might be drawn out and strangulated so as to adhere. In performing this operation, care should be taken to draw out the ciliary rather than the pupillary part of the iris, in order that the size of the pupil may be diminished as little as possible.

ART. III.—*Case of Recto-Vaginal Opening following lacerated Perineum, successfully treated by operation.* By JOHN INGLIS NICOL, M. D. one of the Surgeons to the Northern Infirmary in Inverness, &c. &c. With a Plate.

ALTHOUGH cases of lacerated perineum will sometimes occur under the most skilful management, the kindly disposition of the parts to heal, especially when aided by judicious after-treatment, most commonly precludes those calamitous consequences to the unhappy sufferer of which the following case furnishes an example.

Mrs B. æt. 24, a little woman, was delivered of her first child in the latter end of 1827, after a tedious labour.

The case was conducted by an ignorant country midwife; and the perineum was lacerated to a considerable extent. Ulceration and loss of substance followed; her recovery was tardy; and after along confinement, the feces continued to be voided principally *per vaginam.* A natural delicacy prevented her from applying for surgical assistance until very lately, when, upon examination, I found the parts had healed up, leaving an aperture capable of admitting the finger to pass into the rectum, and distant nearly two inches from the perineal margin of the *os externum.* Through this opening the relaxed folds of the rectum protruded forwards into the vagina, forming a tumour about the size of a walnut, and the fœculent matter kept up a continued excoriation of the passage. By drawing the perineum towards me and reducing the gut, I found it could be retained or confined in its proper place, with the exception of a very small portion towards the lower edge, which by adhesion to the vaginal surface continued irreducible.

The bowels were freely evacuated, and she was placed on a spare liquid diet. The vagina was kept distended by means of a lithotomy forceps, a clumsy expedient, but the only dilator then within my reach.

The gut was reduced, and the perineum kept tense by drawing, as formerly, towards me. The aperture was sufficiently exposed, but it was not until the scalpel, curved scissors, and several other instruments were tried in succession, that I discovered the difficulty of reaching the parts and paring the edges as I could have wished under such circumstances. A duplicature of the vagina fell down between the blades of the forceps and obscured my object. The rectum would frequently resume its place in the vagina, notwithstanding my attempt to keep it reduced by means of sponges, bougies, &c. introduced by the anus.

After several tedious and trying attempts I succeeded at last in denuding the edge of the opening of its coverings, with the exception of the upper extremity, and this I succeeded in abrading by means of a round-pointed scalpel. A couching needle, with a long stem previously perforated near the point, curved to the extent of an inch, and bent at a right angle, was armed with a ligature, and used to bring the edges together, which was effected by means of four stitches with comparative ease.

The aperture thus obliterated presented a puckered appearance, and it was evident, that, notwithstanding every possible care to bring the cut edges together, they were not throughout in apposition, as might be expected, therefore this operation failed.

Adhesion took place, however, to a small extent towards the lower part, and afforded sufficient hope of ultimate success. By this partial adhesion also the irreducible part of the rectum had now disappeared.

Unwilling to risk a second failure by using instruments on which I could not satisfactorily rely, I procured a dilator, long curved scissors, lancet-pointed curved bistoury, and strong needle, represented in the annexed drawings.* The dilator answered my purpose completely. I could see the parts perfectly, and cut with comparative facility between the blades as far as free access went, while their breadth and the curve of the instrument upheld sufficiently the vaginal fold, so annoying in my former attempt. †

At this time I resolved to cut more freely, and passed the bistoury through the lower edge, as if I wished to transfix it to the back part of the rectum, including nearly as much of the vaginal surface contiguous as was considered necessary, and carried it upwards. The yielding nature of the parts permitted too much to be included in this section, profuse hemorrhage followed, further progress was arrested, and it became necessary to use the sponge plug, and put the patient to bed.

A few days thereafter, I proceeded in my third attempt, passing the bistoury after the manner already mentioned, removing the membranous covering to the extent of nearly half an inch along the left side of the opening, and leaving it attached at either extremity. I made a similar attempt on the right side, but the situation of the parts rendered it impossible, save by piece-meal. In this way, however, I detached part after part, snipping off with the curved scissors what the bistoury had partially separated, and succeeded in removing the cicatrices and mucous membrane surrounding the opening to the extent of fully half an inch, without any impeding hemorrhage.

In the removal of the upper part, which was attended with greatest difficulty, I found the small hook used in eye operations highly advantageous in facilitating the access of the scissors, where the bistoury was inadmissible. Satisfied that this stage of the operation was perfect, I brought the parts together with four stitches, introduced by means of the stouter instrument, constructed after the manner of the couching-needle used in my first operation.

Although the shut aperture had the same puckered appearance as formerly mentioned, there could be no doubt but the denuded surfaces were now in contact. Perfect adhesion took

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* In the drawings the instruments are all represented of half the natural size.

† Perhaps the excellent dilator with three blades, invented by Mr Weiss, would have answered still better. The one used on the present occasion, however, answered every purpose, and was constructed on the principle of that recommended by my friend Mr Syme.—See Edin. Med. and Surg. Journ. xxiv. 71.

PLATE I

Nº 1 TO 6 INSTRUMENTS REFERED TO IN D^R NICOL'S CASE

Fig. 1.

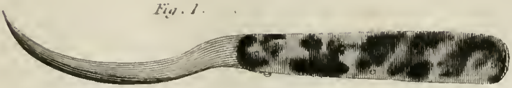


Fig. 2.

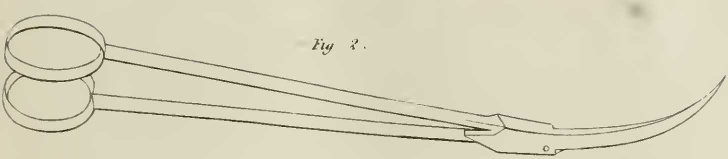


Fig. 3.

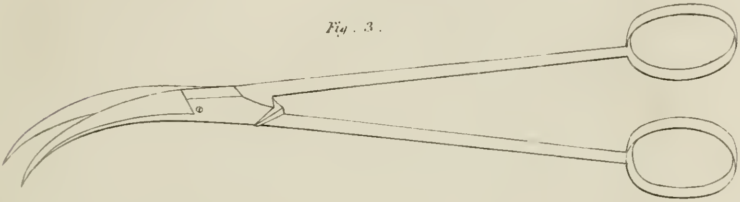


Fig. 4.

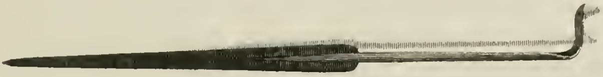


Fig. 5.

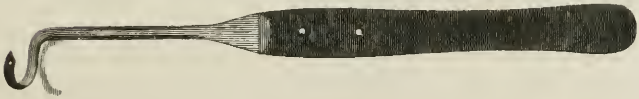
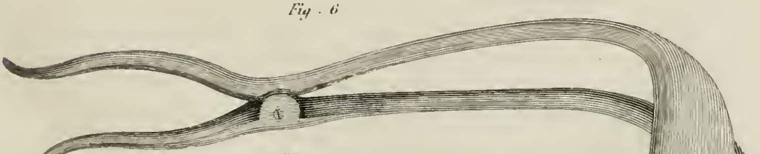
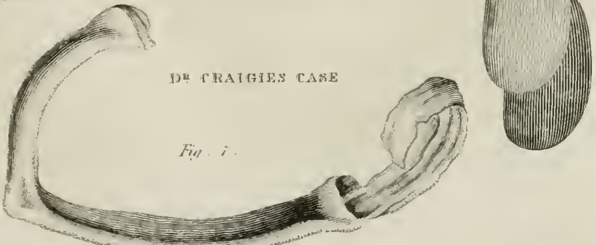


Fig. 6



D^R CRAIGIES CASE

Fig. 7.



Lizars Sculp^t

place, and although alvine matter was observed to pass in very small quantity per vaginam some days thereafter, it was found to have made its way through the suppurated holes of the ligatures. These speedily healed up, and she is now rid of an affliction which must have otherwise rendered her life miserable.

Many of my readers may feel disposed to think that I have been more minute in my details than the merits of the case demanded, especially as at first sight the operation may be considered of easy accomplishment. The difficulty, however, of this and of another similar operation, viz. that for cleft palate, will be estimated on making the attempt.

Cases such as the present, I apprehend, are frequently to be met with among the poor, in those districts where labour is conducted by ignorant homebred country midwifes. In the earlier part of my practice, I recollect to have met with two cases, where the sides of the openings, which were large, and of long standing, were covered with long and ash-coloured vegetations, and studded with hydatids. The constant irritation and consequent profuse sero-mucous discharge proved fatal. I have recently been informed that the Dublin Lying-in Institutions abound with similar cases.

Being of opinion that these openings are caused more by loss of substance from extensive ulceration than by imperfect union of the lacerated parts, and as their edges will consequently be much attenuated, I feel satisfied that paring them alone, and attempting to bring them in contact, will assuredly end in a similar disappointment with that experienced on my first operation. To insure success, a considerable portion of the surrounding surface must be removed, and the parts thus bared must, as it were, be folded together. The ligatures should be passed right through to the rectum, including enough of substance to prevent their working out too soon, and inserted so close to each other as to produce complete mechanical obliteration, otherwise, whenever the gut is distended with flatus, it will certainly make its escape between them, and lessen the chance of adhesion.

Perhaps the introduction and retention of a small elastic gum catheter in the rectum might be useful in obviating the consequences of any such defects.

When the perineum has been once lacerated, subsequent laceration is much more likely to happen. Last winter I was called to a case of protracted labour, where the patient had married late in life, and on two former occasions, the perineum was lacerated. I found the vagina so contracted by the cicatrices, as to be forced before the head of the child in a semilunar fold, stretching across and obstructing fully half the passage. It was peculiarly interesting to mark the difference in the structure obedient to the law of nature from that which resisted it. Perceiving delivery to be impossible without another laceration, I divided this intervening fold with a scalpel, and it was speedily accomplished without either hemorrhage from the section, or any other unpleasant consequence.

ART. IV.—*Researches on the Force of the Aortal or Left side of the Heart.* By J. L. M. POISEUILLE, M. D. lately Pupil of the *Ecole Polytechnique* of Paris. *

THE several attempts which have been made by former physiologists to determine the force of the heart's action have been directed towards very different objects; and consequently, laying aside the effect of errors in the fundamental experiments and in the reasoning founded on them, it was an inevitable result that the conclusions ultimately arrived at should be represented in very discrepant terms. It ought not to excite any surprise, therefore, that *Keil* should have estimated the force of the heart at five ounces, *Hales* at 51½ pounds, *Borelli* at 180,000 pounds. Borelli's object was to discover the intrinsic muscular power exerted to accomplish the heart's contractions, —" the force," as he himself expresses it, " which nature employs to distend its muscular fibres." By a series of vague assumptions, coupled with but a single experimental fact, namely the weight which certain voluntary muscles can sustain by their contraction, he arrived at the conclusion already mentioned, that the force of the heart is equivalent to a weight of 180,000 pounds. This statement, independently of all other considerations, is fundamentally defective, in so far as it fails to present any very definite idea to the mind of the philosophical inquirer. Keil, on the other hand, proposed to ascertain the force of the heart by measuring the rapidity of the current of blood at the commencement of the aorta; and by a series of experiments not always correct, and a train of reasoning often far from conclusive, he drew the inference that the possible velocity of the blood is six feet and a half per second. From this result he further infers by a theorem in dynamics, which it would be out of place to particularize in the present sketch, that the force of the heart is equivalent to a weight of five ounces. If we take up the proposition where Keil dropped it, it may easily be shown by a farther application of the laws of hydrodynamics, that the ultimate and substantial object of Keil's researches was to determine the *Dynamic Force* of the heart, or the quantity of blood which it is capable of raising to a given height in a given time; and that, according to the data he has supplied, this force is sufficient to raise five ounces of blood in the fifth part of a second to the height of eight inches and a half. *Bernouilli* made the dynamic force his express object in his inquiry into the power of the heart's action; and by calculation from the data furnished by Hales, inferred that it is capable of raising 3000 pounds of blood to the height of a foot in the course of an hour. *Hales's* object again was to discover the *Static Force* of the heart, that is the pressure which the internal surface of the left side of the heart sustains in its contractions. He found that in a vertical tube connected with the carotid artery in horses and dogs of various sizes, the blood rose to a height varying from 32 to 116 inches; he then assumed, from the relative size of man to that of the animals on which he experimented, that the elevation in the human subject is probably 90 inches; and the internal surface of the left side of the heart being equal to fifteen square inches, he concludes that the pressure it sustains is equal to 90 times 15 cubic inches of blood, or 51½ pounds. Hales, however, has here overrated the pressure from an oversight in his calculations; for the pressure is represented by the height of the column of blood, multiplied, not by the area of the inner surface of the heart, but by the area of a section of its left cavities made from the base through the apex. This area is equal to the fourth part of the inner surface; so that the pressure, supposing Hales's facts to be correct, is equal to 12.87 pounds.

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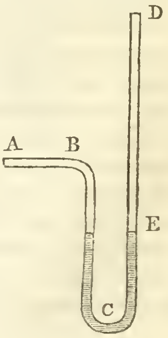
* Translated and abridged from Breschet's Répertoire Général d'Anatomie et de Physiologie Pathologiques, 3me Trimestre de 1828.

Even the results obtained by Hales, however, though the most intelligible of all those hitherto furnished by physiologists, are not to be depended on; for, on the one hand, the height of the column of blood which may be sustained by the action of the heart in man was ascertained only presumptively or by analogy; and, on the other hand, the actual results obtained by experiments on animals are vitiated by his not having provided against the coagulation of the blood in his tubes, it being well known that in the lower animals, and especially in the dog, coagulation takes place with great rapidity as soon as the blood has been expelled from the living vessels.

Of all the modes of viewing the power of the heart's action, its static force is the least speculative, and the most susceptible of physiological application; and it therefore appears to follow, that the first question to be solved is the force with which the heart propels the blood in the aorta. This is to be discovered by ascertaining the height to which a fluid of a given density is raised in a vertical tube in communication with the aorta, and then multiplying the result by the area of that vessel.

According to the received ideas regarding the arterial circulation, the whole force of the aortic heart exerted at each pulsation is not exerted at the same moment in propelling the blood in the arteries; for at each systole of the heart the arteries become dilated, their curvatures tend to assume the rectilinear form, and these phenomena cannot take place but at the expence of the force of the heart. Now these enfeebling causes, to which some authors conceive must also be added the friction of the blood on the arterial parietes, become greater and greater the farther the vessel is removed from the heart. According to these considerations, it would appear that in a tube communicating with the arterial system at various distances from the heart, the rise of the blood ought to be less and less as the distance increases; and consequently, that, in order to determine the force of the heart with exactness, it should be necessary to connect the tube not only with the aorta itself, but likewise even at its very commencement at the heart. This it was plainly impossible to accomplish. An attempt was therefore made to perform an experiment as nearly equivalent as possible, namely, by fixing the tube in the carotid artery, and tying all the other great branches of the aorta close to their origin. But in the course of some preliminary trials, I remarked, to my great surprise, that when two tubes were applied simultaneously to two arteries at different distances from the heart, the rise was precisely the same in both, instead of being different, as I had presumed. My inquiries were consequently much simplified, since, by connecting the tube with any artery, the same results were obtained as by inserting it into the ascending aorta itself.

The tube employed in the subsequent experiments was of the form here represented, the horizontal branch A B being connected with the artery, and the lower part of the curvature B C D being filled with mercury. In order that the coagulation of the blood in the tube might not obstruct its impulsive force, or prevent the operator from observing what modifications the elevated column of mercury might sustain, the part of the tube between the artery and the mercury was filled with a saturated solution of carbonate of soda, which possesses the property of preserving three times its volume of blood in a fluid state for several hours. The extremity A of the glass tube was fixed with wax into a brass tube ter-



minating in a screw, on which could be fastened pipes of various sizes, according to the diameter of the artery. It is evident that when, by the impulsive force of the blood entering at A, the mercury is raised towards D, the column it supports is equal to twice the elevation of the mercury above the point E, at which it originally stood in that limb, *minus* a column of mercury equivalent to the column of blood in the limb B C.

The instrument now described, and which may be termed a *Hæmodynamometer*, having been introduced into the common carotid of a dog, the blood of the artery passed into the horizontal branch of the tube, and, mixing with the carbonate of soda, in less than a second impelled the mercury upwards in the ascending branch to the height of 4.15 inches * above the point at which it originally stood in that limb of the tube. Immediately afterwards it descended a little till it stood at 3.35 inches above its original level, then re-ascended to its former place, and thus continued to oscillate between those two points. When the respiratory movements were regular, and the animal did not struggle, the mercury appeared to rise and fall the same distance on each side of a fixed point of the tube, which in the present instance was at 3.75 inches. But when the respiratory movements were unnaturally strong, the rise and fall were much greater; the mercury sometimes ascended to 4.55 inches, and then descended to 2.95. When during violent struggling the inspirations and expirations were short and broken, the column of mercury varied so much, and so incessantly in height, that no accurate observation could be made on it in such circumstances. The ascent of the column above its mean height uniformly corresponds with expiration, and its descent with inspiration.

The point on each side of which the column of mercury oscillates does not remain always at the same elevation. Thus, in the course of the foregoing experiment, it four times happened that the point in question, or 3.75 inches, alternately rose to 3.8, and fell to 3.3. Hence the force which moves the blood in the arteries varies a little from time to time.

In order to ascertain, therefore, the true rise of the column of mercury under the impulse of the heart's contractions, it is necessary to make a series of consecutive observations on the alternate rise and fall of the column, to take the mean of all the ascents, and the mean of all the descents, and then to take the mean term between the two expressions so procured. A corresponding set of observations and calculations must likewise be made for ascertaining the true height of the column of blood in the descending limb of the tube. The equivalent of this column in mercury being subtracted from twice the mean rise of the mercury in the ascending limb, we procure the height of the column of mercury which is sustained by the force of the blood in the artery. From a series of eight observations on the alternate rise and fall of the mercury in the experiment on the carotid artery of the dog, it was found that the force of the blood in that vessel supported a column of mercury of 6.9 inches.

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* The measurements, which in the original are given according to the French decimal scale, are in this translation carefully altered to the ordinary English measurement.

It has been already remarked, that the rise of the mercury in the tube is the same in different arteries of the same animal at different distances from the heart. This singular and unexpected fact was established by a great number of experiments. When the left carotid and left humeral arteries of a dog were simultaneously made the subject of experiment, the diameters of the arteries respectively being $\frac{20}{100}$ and $\frac{11}{100}$ of an inch, and the distances from the heart 8.2 and 20.0 inches, the mean of eleven double observations on the alternate ascent and descent of the mercury gave precisely the same result for both arteries. The column of mercury supported was in each tube 7.05 inches. The tube connected with the humeral artery being left in its place, that which was fixed in the carotid was transferred to the left common iliac, the diameter of which was $\frac{19}{100}$ths of an inch, and its distance from the heart 32 inches. The very same results were then obtained as before, namely, the force of the blood in the common iliac sustained a column of mercury equal to 7.05 inches.

The foregoing experiment was repeated with the carotid and crural arteries of another dog; their respective diameters being $\frac{15}{100}$ and $\frac{13}{100}$ of an inch, and their respective distances from the heart 7.1 and 20.3 inches. From the mean of six double observations, it was found that in each vessel the force of the blood sustained a column of 3.9 inches. This experiment was repeated once in the presence of M. Cruveilhier, and again before M. Magendie; and the identity of the pressure was recognized on both occasions.

When the experiment was tried with the aorta and carotid artery of another dog, the diameters being $\frac{15}{100}$ths and $\frac{35}{100}$ths. of an inch, and the distances from the heart 7.1 and 14.5 inches, the pressure, as deduced from eight double observations on each vessel, was again found the same in both, and to be capable of sustaining 3.3 inches of mercury.

On another dog a similar experiment was made with the axillary and femoral arteries. The diameters of the vessels were $\frac{17}{100}$ths and $\frac{15}{100}$ths of an inch, and the distances of the tubes from the heart 4.9 and 20.3 inches. For both vessels the mean terms of twelve double observations on the extreme ascents and descents gave a pressure of 2.9 inches of mercury.

The last experiment to be noticed was made on the horse. The vessels selected were the common carotid, the diameter of which was $\frac{54}{100}$ths of an inch, and its distance from the heart 39.2 inches, and a muscular branch of the thigh, situated six inches from the femoral artery, 67½ inches from the heart, and only $\frac{7}{100}$ths of an inch in diameter. The enormous difference between the two vessels in this instance, both in point of volume and in distance from the heart, would certainly have occasioned a notable difference in the pressure indicated by the Hæmodynamometer, if any such difference really existed. But on the contrary, as in all the former experiments, the mercury, according to the mean of nine observations, rose in both tubes to precisely the same elevation, and indicated a pressure equivalent to a column of mercury of 5.8 inches.

From the identity of all the foregoing results, it may be safely concluded, that the force with which a molecule of blood moves in the carotid, or in the aorta, is precisely the same with the force of its movement in the smallest arterial branches: or, in other terms, that a molecule of blood moves with the same force throughout the whole arterial system,—a fact which, in common with all physiologists, I was far from anticipating.

It is not easy to account for the uniformity here unfolded. When the heart contracts, a wave of blood is pushed into the arterial system already full of blood. The phenomena that ensue are dilatation of the arteries, and a kind of locomotion of the arterial sytsem, by which its curvatures tend to straighten themselves. These changes cannot take place except at the expence of the force with which the wave is propelled from the heart. But hardly has the arterial system become dilated, and scarcely have its curvatures yielded to the action of the heart, when the arteries, through the elasticity of their coats, contract again, and restore to the force of the blood all the loss it had sustained. In this way perhaps we may explain how the intensity of the force communicated to the blood by the heart is preserved, as the experiments above-mentioned have shown, even to the last arterial ramifications. It must be allowed, however, that this explanation is far from being altogether satisfactory. Some other ideas which have occurred to me on the subject are not sufficiently matured to be laid before the reader at present, and will require farther investigation.

Meanwhile, let us return to the experiments related above, and examine, in the first place, the influence of the respiratory movements on the course of the arterial blood.

The height of the column of mercury which is supported by the impulse of the blood is always least in inspiration and greatest during expiration. Hence it will be concluded that the force with which the blood moves is diminished during the former, and increased during the latter. The last of these facts was established by Haller, Lamure, and Lorry, and has been more lately confirmed by Magendie.

If the heights of the columns corresponding with inspiration and expiration be compared with one another at various distances from the heart, we shall find, that when the inspirations and expirations are natural the difference between the heights of the columns is the same every where. During violent respiratory efforts the difference is slightly increased, even at a distance from the heart. It was somewhat increased, for example, by forcible respiration in the branch of the femoral artery of the horse in the experiment formerly noticed. * But this increase is quite insignificant when compared with what takes place under the same circumstances nearer the heart, for example in the tube connected with the carotid artery. Thus, during easy respiration the surface of the mercury in the ascending limb of the Hæmodynamometer ranged between 3.35 and 3.75 inches above the point of zero, the former corresponding with every inspiration, the latter with every expiration; but when the animal breathed with violent efforts the range was between 2.35 and 4.75, 1.4 and 5.7, 0.2 and 6.9, and even sometimes from 0.0 to 7.1. These observations make it evident, that when violent respiratory efforts succeed natural breathing, a great influence is exerted on the force with which the blood moves in the larger vessels: Nay, that when the effort is very great its force is lost nearly or even altogether during inspiration; while in return it becomes, during the corresponding expirations, twice as great as in the natural state of the circulation. I am not aware that authors who have treated of the modifications which the act of breathing produces in the course of the arterial blood, have taken notice of the influence of inspiration, which may thus be so great as to check the course of the blood altogether. Neither am I aware of their having noticed the great difference which exists in this influence on the course of the blood in the great and small arteries,—a difference which could not easily

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* The author appears to have committed an oversight here; for, according to the numbers given in his table for the branch of the femoral artery during forcible respiration, the difference between the height of the column corresponding with inspiration and that corresponding with expiration, is actually *less*, instead of being greater, than the average during natural breathing.—(Ed.)

be anticipated, since the arterial system forms a continuous whole, and the fluid contained within it is moved by a force which it derives primarily from a single organ, the heart.

If the present exposition had not already exceeded the limits originally intended, it might have been useful to remind the reader, in further illustration of the influence of respiration on the movement of the blood in the arteries, that it is during fits of coughing, or exclamations of wrath, and the like, that the aorta and aneurysmal tumours burst, that hemorrhage takes place from the nose, as well as extravasations within the head. Mention might also have been made of the necessity of observing during the examination of the pulse of a patient, whether the breathing is natural. For if, in consequence of lively emotions, the patient should at certain intervals make a forcible inspiration, a pulsation may be retarded, or even altogether prevented, and consequently induce the observer to believe the pulse to be irregular or intermitting. One may easily be satisfied of the accuracy of these assertions by experiment on his own pulse.[*] An explanation might farther be given of the well-known fact, that in amputation of the arm or breast the jet of blood springing with violence from the divided arteries is sometimes all at once suspended, while in amputation of the limbs or toes, the jet, though less violent, is continuous and jerking.

Let us next turn again to the original object of the present inquiry, the force of the heart's action.

Since the pressure indicated by the Hæmodynamometer is the same, whether it be applied to the aorta itself or to any one of its branches, it is clear that a single experiment on an artery of an animal will suffice to establish the precise force of its heart. The animals which have been made the subject of experiment are the dog and the horse. The following table of the results obtained in different individuals, and the conclusions which these results furnish, will point out whether it is possible to determine by analogy the force with which the blood moves in the arterial system of man.

	Weight of Animal.	Weight of Heart.	Pressure.
1. dog,	,,	6.62 oz.	5.9 inch.
2. do.	,,	3.87	5.8
3. do.	,,	3.87	5.6
4. do.	34 lbs.	4.75	6.2
5. do.	42	4.12	5.8
6. do.	28	3.75	6.6
7. mare,	,,	108.0	5.8
8. horse,	,,	70.0 oz.	5.8 inch.
9. dog,	86 lbs.	7.25	7.1
10. horse,	,,	80.0	6.2
11. do.	,,	86.0	6.1
12. mare,	,,	54.0	7.2
13. dog,	19	2.75	5.6
14. do.	41	6.75	6.9

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[*] The power of forcible inspiration to suspend the movement of the blood in the greater arteries may be still more strikingly exemplified by an extension of the author's ingenious experiment, namely, by closing the glottis and making a continued

On attending to the pressure produced by various hearts it will appear surprising that a heart weighing only $3\frac{7}{8}$ ounces should give the same pressure as hearts weighing $4\frac{1}{8}$, 70, or even 108 ounces, and that another of the weight of $7\frac{1}{4}$ ounces should give a pressure superior to that produced by hearts weighing 80, 86, or 108 ounces. It is plain from these facts, that the pressure bears no relation whatever to the weight of the heart. May it not therefore be inferred, that the differences observed in the pressure according to the table now given, (differences which range only from 5.6 to 7.2 inches) depend on individual circumstances, such as age, sex, state of health, and the like, which could not always be accurately appreciated? May it not be concluded, as a general consequence, that, *cæteris paribus*, the pressure sustained by the blood of an artery of an animal of 600 or 800 pounds in weight, of a horse, for example, is the same as that sustained by the artery of a much smaller animal, such as a dog, weighing only 20 pounds? Thus, then, if two arteries of the same size be taken, one in the dog, the other in the horse, notwithstanding the enormous difference between the weights of these two animals, the total forces which move the blood in the two arteries will be precisely the same.

Now, in man, as well as in the dog and the horse, an artery of the same calibre, will, generally speaking, be destined to nourish an equal mass of parts. There appears no reason for thinking therefore, that, *cæteris paribus*, the force which moves the blood in an artery of one is different from that which moves it in arteries of the same size in the two others; these forces, then, may be considered as identical.

Farther, if we remark that the variations of pressure obtained for the dog are the same with those presented by the horse, we may—from the preceding considerations, and from what we know of the differences of force which the pulse presents in a certain number of healthy men of the same age, stature, and temperament,—apply to man the variations of pressure observed in the dog and horse. The arterial pressure in man will therefore vary from 5.6 to 7.2 inches.

To conclude, since a molecule of blood at any point whatever in the arterial system is moved with a force which is in equilibrium with a column of mercury of a known height, in order to obtain the force corresponding to an artery of a given calibre, it is merely requisite to ascertain its diameter; and the

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forcible effort to inspire. When the circulation is tranquil, for example, in the evening some hours after a meal, the pulse at the wrist may in this way be stopped altogether for twenty or five-and-twenty seconds. When the circulation is excited, as it commonly is throughout the day, by digestion, bodily exercise, mental exertion, and the like, the pulse, though not arrested, is greatly weakened.—[Ed.]

weight of a cylinder of mercury, the base of which is the circle described on that diameter, and its height that of the column of mercury obtained, will be the total Static force with which the blood moves in the artery; that is, if a septum were retained in the artery by a force pressing in a direction opposed to the current of blood, and equivalent to the said weight, the blood would cease to flow in the artery.

It may be established as a general theorem, therefore, that the total Static force which moves the blood in an artery is in the direct ratio of its area, or of the square of its diameter, whatever be the situation which it occupies.

As an example of the application of these principles, let us endeavour to ascertain the force with which the heart propels the blood in the aorta and in other arteries, such as the radial. In a man twenty-nine years of age the diameter of the aorta at the level of the semilunar valves was found to be 1.34 inch under a pressure of 6.305 inches of mercury, which is the mean between the extremes of the pressures stated above. Hence the area of the circle of the aorta is 1.4097 square inch. This multiplied by 6.305 inches the height of the column of mercury will give 8.888 cubic inches of mercury, or about $72\frac{1}{3}$ ounces avoirdupois, which is the equivalent of the total Static force of the blood in the aorta at the moment of the heart's contraction. In the body of another man forty-six years old the aorta under the pressure of 5.52 inches (the lowest pressure observed in the experiments mentioned in the table) measured 1.38 inch in diameter, hence its transverse area was 1.4957 square inch. This multiplied by the pressure or height of the column of mercury supposed to be sustained by the force of the blood, namely 5.52 inches, gives 8.256 cubic inches of mercury, which are equal to 67.2 avoirdupois ounces.

In the mare which was the subject of experiment 12 of the table, it will be found by a similar calculation that the force with which the heart moves the blood in the aorta is equal to 192.8 ounces.

The radial artery under a pressure of 6.305 inches has a diameter of 0.11 inches. From these data it will be found that the force with which the blood moves in it is equivalent to a weight of 0.56 of an avoirdupois ounce, or 245 troy grains.

From the preceding inquiries it results that the force of the heart, which has been determined by the above-mentioned experiments, is neither equivalent to that of Borelli, nor to the Dynamic force of Keil, nor even to the Static force of Hales, but is the force with which the heart impels the blood in the aorta or in any other artery. I have thought that this mode of estimating its power will be considered preferable to those which former authors have adopted, because it leads to more direct results.

Before quitting the subject it may be right to allude briefly o the applications of which the Hæmodynamometer used in the foregoing experiments is susceptible. It will manifestly be of great use in determining to a nicety the modifications which the respiratory movements produce in the arterial as well as the venous circulation. It will also determine the modifications which the force that moves the blood undergoes from age, from the blood being rendered artificially more watery, from its mass being diminished, from a portion of the arterial system being cut off from the whole by ligatures, from particular substances such as camphor, assafœtida, alcohol, and the like being introduced into the current of the circulation, from the animal being in any way excited by violent emotions, and so forth. I propose in a subsequent memoir to investigate some of these questions, which are of great interest in regard both to medical and surgical pathology.

ART. V.—*A Case of Perforation of the Stomach and Œsophagus, with brief remarks.* By MARSHALL HALL, M. D. F. R. S. E., &c. &c.

THE little girl whose case I am about to describe, had been subject from a very early period after its birth, to attacks of bronchitis.

Early in April it became affected with pertussis. The symptoms of bronchial and pulmonary inflammation called for the abstraction of blood; and three, and then two leeches were applied to the chest on two successive days, with other remedies usual in such cases. This was followed by exhaustion with reaction, the countenance varying, being sometimes pallid and cold, and sometimes flushed, and the pulse frequent and jerking. Soon after the second application of leeches, there were also frequent fits of convulsion, for which a cold lotion was applied to the head; and the warm bath was used frequently. The *hydrargyrum cum creta* was administered, with a mild nutritious diet. There was no sickness, no diarrhœa.

After a variable state of things this little patient sank and expired, having lingered eight days.

Permission could not be obtained to inspect the body until the fifth day after death. The morbid appearances were then carefully noticed by Mr R. Welbank and myself.

The general surface was extremely pallid, but there was little or no emaciation.

The bronchiæ were clogged with mucus, and the lowest lobe of each lung was hepatized.

On looking into the right cavity of the thorax, a small portion of venous blood was observed. The source of this was carefully traced. A small part of the pleura immediately adjacent and above this spot, extending upwards over the convex surface of the vertebræ, was found perfectly removed by erosion; the subjacent veins had been opened by the same process, and their blood had escaped; the nerves were left entire, as it were beautifully dissected. Proceeding with the examination, there was found at a part which corresponded with these appearances, an opening that penetrated into the œsophagus; and through this opening, a portion of the contents of the stomach flowed on raising this organ. At the same moment the rest of the contents of the stomach escaped into the abdomen, through a large orifice at its most dependent part.

On further examination of the state of the œsophagus and stomach, the mucous membrane was found uniformly reduced to a gelatinous mass; the textures constituting the former were pierced by an irregular opening of a size less than that of a pea; the peritonæum covering the latter was destroyed to a considerable extent. But there were no appearances of disease about the edges of either orifice.

The head was not examined. The other viscera presented no unnatural appearances.

The case thus briefly detailed leads to some remarks of great interest.

1. It cannot be doubted that in this case the perforations of the œsophagus and of the stomach resulted from the action of the gastric juices after death. This appears to be proved by the eroded state of the adjacent parts. This fact may therefore be regarded as established by the present and similar cases.

2. It is equally certain that there is one special disease or disorder of infants which leads to similar results, as stated in the interesting and valuable paper of Dr John Gairdner, in the Transactions of the Edinburgh Medico-Chirurgical Society, Vol. i. p. 311.

3. It is a point of the utmost importance to state in the account of post mortem appearances, at what precise period after death the examination was made; and it might be useful sometimes to make the examination at two distinct periods, taking care not to disturb the parts at the first.* It is quite plain, that, had the parents of the little girl whose case has been given, earlier consented to an examination of it, some of the ap-

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* A pointed experiment such as the author proposes has been already made by Mr Allan Burns.—See this Journal, Vol. vi. 135.—[Ed.]

pearances which have been described would not have been observed.

4. It would be interesting to make a series of observations on rabbits and other animals, with a view of determining the circumstances which favour or oppose the erosion of the stomach by the gastric juice. The observations made by Dr W. Philip, in the third edition of his singularly admirable work on the Vital Functions, pp. 131, 132, appear to be too general on this point.

5. We might possibly employ the gastric juice in the minute dissection of the nerves, since this texture appears to resist the action of this agent, whilst that of the other parts is destroyed by it. The fact itself is mentioned by M. Cruveilhier, in his Medecine Pratique, Cahier i. p. 143.

ART. VI.—*Description of Apparatus and Experiments for determining the composition of the Blood in health and disease.* By W. REID CLANNY, M. D. Sunderland.

IN my lecture * upon typhus fever, which was published about sixteen months ago, I necessarily confined myself to the mere outlines, in order that I might not detain the audience more than an hour; and in printing this lecture, I neither added nor subtracted from what was delivered.

I now proceed, for the satisfaction of the profession, to give a brief sketch of the plan which I adopted in these investigations.

I ordered a twenty ounce graduated air-tight flask to be made, to which a stop-cock was screwed, and having attached the flask to the aperture in the plate of the air-pump, by means of a brass tube, I exhausted the atmospheric air from the flask by the air-pump. Having removed the exhausted flask from the air-pump, I attached to it above the stop-cock a tube about the diameter of a swan's quill, bent at a very obtuse angle, and having a ball blown upon the angle.

When the blood flowed from the vein, I held the glass tube as near as I could to the bleeding vein, but not touching it, and kept the flask in a suitable position till the glass bulb was filled. I now opened the stop-cock, and the blood rushed into the empty flask from the glass bulb. In this way I so managed the stop-cock, that, as the blood continued to flow into the glass bulb, it was permitted to rush into the exhausted flask, till I had taken a suitable quantity of blood *in vacuo*.

After some practice, I was enabled to manage the stop-cock, so that I could take whatever quantity of blood I required with the greatest facility.

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* For a notice of the contents of Dr Clanny's Lecture, see the Medical Intelligence of this Journal, xxx. 221.

The next step was to shut the stop-cock, and remove the glass bulb from the flask, and attach to it a well constructed apparatus for drawing whatever gas might be contained in the blood through a graduated flask of lime-water, placed in the exhausted receiver of the air-pump. In this manner the carbonic acid of the blood coming into union with the lime of the lime-water, and forming carbonate of lime, the quantity of carbonic acid in the blood was very readily and very accurately ascertained. I was particularly cautious, by a proper arrangement of valves, that no lime-water found its way into the flask containing the blood, which otherwise will always be the case when the atmospheric air is permitted, (after this part of the experiment is finished,) to pass into the receiver of the air-pump.

It is necessary to mention that the flask, previous to its being used, was weighed; and after the carbonic acid was removed from the blood by the above-mentioned apparatus, the flask, with its contents, was again weighed.

The next process was to set the flask containing the blood upon its side, and after it had stood in that position for two or three hours, I poured off the whole of the serum in the most careful manner. The serum was coagulated at a well regulated temperature, and being cut into small pieces, was placed upon a perforated Wedgewood funnel, and the serosity drained off; besides which, the coagulated albumen was washed most carefully with warm water, and the washings added to the serosity.

The coagulated albumen was weighed. The serosity and the washings of the coagulated albumen were placed in a Wedgewood capsule and evaporated, and the salts which were left were collected and weighed. The crassamentum from which the serum was poured was weighed; and the fibrin separated from the colouring matter was collected in a fine linen bag, through which a current of distilled water was passed. The fibrin was pressed for some time in a press of my own construction; and when all the water was pressed out, and the moisture removed from its surface, it was weighed.

The solution of the colouring matter which passed through the linen bag was evaporated, and the colouring matter weighed.

I adopted the plan of receiving blood *in vacuo*, in order that the oxygen of the atmosphere might have no chance of uniting with the carbon of the blood in its transit from the vein into such vessels as are usually had recourse to for receiving blood; and by way of putting this plan to the proof, I constructed a graduated jar sufficiently large to hold a suitable portion of warm distilled water, into which the hand of a man with an opened vein could be most conveniently held till fifteen or twenty ounces of blood were taken. To this jar a well-ground plate and stop-cock were attached after the blood was taken, the space which was left by removing the hand being supplied by hollow metal balls. The blood always keeps to the bottom of the water, and not one particle comes up to the surface.

This jar containing the blood and warm water was attached to the apparatus above-mentioned, and placed in the exhausted receiver of the air-pump. I found the same results in both cases.

When I expected to meet a difficulty in procuring blood, I requested the surgeon to secure the arm or wrist in the usual manner, and place himself by the shoulder of the patient; and instead of carrying the lancet into the vein, so as to form an acute angle with the current of the blood, he was desired to penetrate the vein with the point of the lancet towards the hand, as by this plan the blood flows at an obtuse, not an acute angle, to its current towards the heart. This plan suggested itself to me in cases when the veins were peculiarly small, deep-seated, or imbedded in fat, and I have reason to be perfectly satisfied from ample experience, that this is the best plan, even in ordinary cases.

I have always found the greatest difficulty in heating fibrin of the blood, so as to obtain uniform results; for fibrin may be gradually heated till it lose one-half of its weight, though its general appearance and qualities remain the same. On this account I constructed my fibrin press, which I consider indispensable for comparative trials in cases of sound or unsound blood. I may remark in passing, that I could perceive no difference in the time required for coagulation of blood, whether it was taken in the usual manner, in vacuo, or in water. At the same time, I acknowledge that my attention was only slightly directed to this phenomenon; nor did I ever make any direct experiments, so as to be able to form a correct opinion upon this question.

In this manner I have followed up my inquiries, and feel perfectly satisfied, from the great attention bestowed, and the innumerable experiments performed, that I could not have adopted a better method of investigation, for the purpose of ascertaining those important changes which, of a surety, the blood undergoes in many diseases. I confidently recommend this plan to the attention of my professional brethren. All my experiments have been as open as the nature of the subject would permit, and all the apparatus which I have employed in my investigations has been placed in our infirmary for the last two years, not only for convenience, but also, as intimated in the preface to my printed lecture, for the inspection of the faculty and other men of science.

In conclusion, I feel confident, from the additional experience of sixteen months, that my view of the proximate cause of typhus fever is perfectly correct, and I request that the subject may be entered upon by persons qualified for the task.

ART. VII.—*Case of Spina Bifida.* By WILLIAM LAW, Esq. Fellow of the Royal College of Surgeons, Edinburgh.

[Read before the Edinburgh Medico-Chirurgical Society.]

I HAD occasion to treat a case of this disease some years ago, along with another surgeon, but with such unpromising aspects almost from the first, that any detail of its complete failure could hardly be read with interest. When the capsule at the part was emptied each time, there was an evident draining of the fluid previously prominent at the fontanel, flaccidity taking place at the distended sutures of the cranium.

The case, however, I propose now to describe was so near a successful termination, and was reversed so very unexpectedly, undergoing its changes in an unusually short period, that I consider it well worth attention. The child was a male, rather more than two months old when I first saw it; and the disease, of a hemispherical form, two inches in diameter, was in the usual situation on the lower part of the lumbar region. This was about the 20th of September; and a few days after when the mother agreed to have it punctured, I proceeded to do so with a lancet. The instrument was pushed into the most prominent part near the middle, and on this occasion seemed to enter a membranous capsule, distinct from the outer skin; the swelling was more than half emptied of a thin watery fluid mixed with blood, which appeared to flow from the divided edges. A little patch of adhesive plaster was put on the opening, and a fold of linen and flannel with a piece of pasteboard, quilted with tow in a circular form, bound over the part by a roller. The child did not seem much affected by what was done. Three days after, the pasteboard being removed, the swelling was found of its original size, when the water was again drawn off at a new opening, and the pasteboard applied as before. In three or four days it was again done, but I changed the pasteboard for a piece of circular cork, which having a slight projecting rim on the edge of the surface applied to the tumour, and a strap of adhesive plaster across, remained more steadily on the part. After the first occasion, I twice made the openings more to the side of the tumour, lest I might bring on ulceration where the integument was so thin as to be almost vesicular; but after a few applications of the cork compress this precaution became quite unnecessary, as great thickening took place at this part.

It was seldom now necessary to puncture, simple tightening of the roller over the compress answering every purpose. The tumour had become flat, projecting scarcely one-fourth of an inch from the surface, not hanging pendulous, as in one of Sir A. Cooper's cases, and was in its exterior so thick and unyielding as to afford no space within for a fluid, which, if any now remained, must have been quite beneath the level of the surface. A too frequent evacuation of the feces (which in themselves seemed all along healthy) had ceased, and even a constant discharge of urine, which at first gave bad hopes of ultimate success, had been quite corrected. The skin in general became mottled like that of most healthy infants, and, in short, the case in every respect proceeded with prospects beyond what could have been anticipated.

Nothing seemed now remaining to be done but to preserve for a short while the ground which had been gained. About the third week of October, however, some increase reappeared in the part; the fluid discharged by puncture was thick; and at the next opening on the 24th had become purulent. Still, however, let it be observed, the little patient seemed unaffected constitutionally, and I was much surprised on the 26th, to be informed of its death, with no other precursor than that about forty-eight hours before, when its clothes were changing, something was heard to snap or give way as it were about its person, compared in sound to that caused by the fracture of a nut. From this time the mother, in her homely idiom, said it was much "distressed with the nerves;" but I cannot say I could perceive any remarkable change, or such a one as to induce me to remit the treatment.

On dissection, I found, exterior to the spinal sheath, a distinct cavity where the pus had lodged; but whether communicating with that canal by a small opening, I cannot, from a little injury done in clearing out the matter, be quite certain. There was a slight appearance of extravasation beneath the cyst, but I did not in dissecting perceive any fracture of the ligaments or bones, if such took place when the snap was heard, and which might have let the purulent matter in upon the spinal cord. Some considerable injury, however, may have taken place at this time. I took a passing view of the abdominal viscera, which seemed healthy.

On further reflection, I am inclined to think, I ought not to have continued the pressure, when I found pus discharged from the puncture. The absence still of all bad symptoms rendered it probable that there did not then, at least, exist any connexion with the important part beneath; but the fear, on the other hand, of allowing the protrusion of the former watery bag, at what might now have been an ulcerated aperture, a trust in the law of the system, that matter, when formed generally, tends to the surface, and a hope that the cavity in which it existed might diminish at each discharge, made me, in choosing between two evils, believe it safer to keep the part reduced as it was, rather than expose it to the irritation of mechanical friction, which it must have undergone from its situation on the exterior of the body.

In similar circumstances, that is, if the treatment unexpectedly produced the suppurative action, the inflammation proceeding beyond the mere desirable adhesive thickening, I would be apt to leave nature in this stage more to her own course; but the account of my error, if such it was, may prove beneficial to others on a like occasion.

Mr Law Senior saw the case several times along with me.

38, *York Place, Edinburgh.*

ART. VIII.—*Observations on Sea-Scurvy, as it occurred in the Private Ship ——— during a Passage from Bombay to England.* By GEORGE KIRK, M. D. Surgeon of the Vessel.

SINCE Captain Cook's celebrated voyages of circumnavigation, the disease called scorbutus, as prevailing amongst seamen, has received much attention, and the necessity of its prevention, and the means best suited for that purpose, have been well understood and appreciated. Indeed, in this disease perhaps more than in any other, prevention is a paramount object, from the circumstance, than when it has appeared in a ship's company, it is under such a combination of circumstances, as to bid defiance to the best directed efforts for cure, until the ship's arrival in port. Happily this combination, in consequence of the excellent discipline and mode of diet among seamen, so rarely occurs, that sea-scurvy may be now said to be almost an anomalous appearance. That it does occur, however, in a certain class of merchant ships on long voyages oftener probably than may be generally supposed, I have some reason to think; and as it has fallen to my lot to see it devastating almost the whole crew of a small ship, and conceiving that every one ought to contribute the facts that have fallen under his observation to the general store of medical knowledge, the following remarks on the subject have been thrown together. In order to render this account more intelligible, it may be necessary to narrate the following circumstances regarding the voyage. The ship was of 365 tons burden, and manned by a crew of 22 in number. In the passage out to Calcutta nothing particular occurred, the people having been in good health; but before the ship left Calcutta, where she remained nearly four months, most of them suffered severely from fevers, &c. by which, with the necessary depletory measures of bleeding, purging, &c. they were reduced to a state of debility which was never during the remainder of the voyage entirely recovered from. In this debilitated condition the crew were considerably exposed during an uncomfortable tedious passage of nearly twelve weeks continuance round to Bombay. In passing down the River Hoogley, from exposure to the excessive sultriness of the weather, five of them were struck down in one day with "*coup de soleil*," on account of which they had to be powerfully depleted. One man the previous day died of apoplexy. Finally, the ship passed St Helena on her homeward passage on the 31st December, without, however, touching there for supplies; the people at this time continuing all well. About a fortnight afterwards scorbutic symptoms began to appear in two of the crew.

On the 12th February ten were on the sick list with scurvy. Previous to this provisions had begun to run short, and the ship's company had been put on half allowance of bread. At this date I observe the following note in my journal:—"From this day commences the following reduced scale of diet, viz. to each man per day, bread, quarter of a pound; rice, one pound per week, or about two ounces per day; coffee morning and evening; beef, water, and peas soup as formerly," (namely, full allowance.) On the last day of February our store of bread, rice, flour, peas, was entirely expended, and nothing remained but salt beef, coffee, and water. On the 5th March supplies of potatoes, flour, bread, rum, &c. were obtained from a ship spoken with, and on the 29th the ship arrived at a port in Ireland, having been beating, for four weeks before, against strong easterly gales.

When the scurvy was at the worst, eight only were doing duty, including the officers. Of this number one-half were scorbutic, but able, notwithstanding, to do duty. The supply of provisions from the ship spoken with preserved them.

The disease began to appear about the middle of January. At this time there was a perpetual succession of heavy rains during ten or twelve days. The two first affected complained of languor and debility, with disinclination to motion; the gums were swollen and painful, and the legs covered with petechiæ. In the progress of the disease the petechiæ appeared on the thighs, with vibices and maculæ, and large spreading discolorations; the tendons of the flexor muscles of the leg became rigid and contracted; the legs swelled and became insufferably painful; the gums spongy and swollen, bleeding profusely in some, and readily made to bleed in all. In one case sphacelation of the gums to an alarming degree occurred; the teeth became loose; the breath fetid; respiration easily hurried; pulse feeble; syncope occurred on the slightest exertion; severe shivering fits or hectic accessions also prevailed; the mind was in general despondent; the countenance wan and collapsed. In some cases the cicatrices of old sores became painful and deeply red, but only in one case broke out into an ulcer, from which an unhealthy fungus protruded; and, though it did not spread much, it never healed whilst under my care.

I shall now give an abstract of the first three or four cases which occurred, and as the features of the disease were much alike in all the rest it will be unnecessary to detail more.

Case I.—J. J., ætatis 35, of dissipated habits, was the first who betrayed scorbutic symptoms. About the middle of January he began to complain of general pains, with lassitude and debility, but more especially of pain and stiffness in the flexor muscles of the leg. The legs were covered with petechiæ; gums sore and swollen; teeth loose; appetite impaired; bowels constipated. These symptoms became daily aggravated; the respiration was hurried by the slightest exertion; the pulse small and accelerated; the stiffness and pain and hardness of the flexor muscles of the leg increased to that degree that he became quite incapable of locomotion; the prostration of strength was so complete that the exertion even of turning out of his hammock would often occasion the most alarming syncope; and he was obliged almost perpetually to lie in the horizontal position, any other posture, even that of sitting, being attended with excruciating pain of the limbs, feeling of vertigo, and hurried respiration. The gums became more and more fungous, separating from the jaw-bones, and overhanging the teeth; and on one occasion they suddenly bled so profusely that he fell into a syncope, from which, with difficulty, he was recovered. His urine was copious, high-coloured, depositing a sediment, and sometimes exhaling a most offensive odour. He had frequent hectic accessions, but not so violent as in Cases III. and IV. Bowels various, generally constipated, sometimes loose. The emaciation and debility progressively increased. To his other sufferings, about the middle of February, there was added a very troublesome dry cough, with extreme difficulty of deglutition. The cough appeared to depend on irritation of the epiglottis, by falling down of the uvula from relaxation. He gradually became exhausted, and death at length took place on the 24th February, preceded by cold sweats, cold extremities, subsultus tendinum, coma, and the usual symptoms.

This patient's diet consisted almost wholly of boiled rice, or of biscuit soaked in coffee. Neither he nor any of the other sick had been able for many weeks to eat salt beef, on account of the painful condition of the gums and mouth.

Case II.—J. G., ætatis 35, of cleanly orderly habits. This case was chiefly remarkable for the sudden and extreme prostration of the strength, with frequent syncope from apparently the most inadequate causes. There was also the greatest lassitude and despondency of mind. Both feet were much swollen and tense, with a total inability of standing from the excessive violence of pain in the feet and legs when in the erect position; but in the horizontal position he was in general perfectly free of pain; the gums were very sore and swelled, but seldom bled any; breath offensive; flexor tendons of the leg rigid and hard; petechiæ numerous on both legs; pulse feeble; respiration accelerated; cold shiverings almost daily, but less severe than in the following case. Like the rest he became progressively worse, and like Case I. was latterly affected with a tickling cough, which prevented sleep and entirely exhausted him, arising from a similar cause, as I suppose; and he sunk in a similar manner on the 5th March.

The tempestuous state of the weather, and the feelings of the officers and crew, prevented me from inspecting the bodies after death in both these cases, which were the only fatal ones.

Case III.—J. F. ætatis 40, of dissipated habits. In addition to all the symptoms and appearances enumerated above, in this case the mucous membranes were considerably affected. He once or twice bled at the nose, frequently from the mouth; and his stools consisted often chiefly of blood. There were hæmorrhoidal tumours externally. One leg was exceedingly swollen, tense, shining, wholly discoloured, livid, yellow, brown; the muscles of the leg rigid, hard; flexor tendons contracted, stiff, with inability of extending the leg; pain through the thigh and leg sometimes insufferable, especially at night, utterly preventing sleep. Gums much vitiated; teeth quite loose; breath very fetid; accessions of cold and violent shiverings continuing for hours. On arriving in port he rapidly recovered.

It is unnecessary to detail more cases. The features of the rest were similar. The causes which to all appearance gave rise to the disease were the following:—

1. Previous diseases, and the debilitating circumstances alluded to above, predisposed the people to it. Of nineteen months, (the duration of the voyage,) they had been nearly fourteen at sea on the usual diet of seamen. During a sultry and sickly season at Calcutta, they were debilitated with fevers and other diseases; and finally, we must take into consideration the debilitating effects of the unbounded intemperance to which seamen are so prone to surrender themselves on arriving in port.

2. The length of the homeward passage, together with insufficient nutriment. For 174 days, the ship continued at sea without touching at any port, and during most of this time, the diet of the seamen consisted, I may say, almost solely of salt beef or pork, biscuit and flour, the people, owing to a prejudice common amongst seamen, never making use of the rice or peas provided by the ship; add to this the unfortunate falling short of provisions towards the end of the voyage, each man being reduced to one-fourth the usual allowance of bread, and the flour and every other sort of vegetable food being entirely expended.

3. Discontent and the depressing passions of the mind formed another chief cause in our case.

4. Dampness and cold. The disease began to excite alarm during a long continuance of rainy weather; moreover, the forecastle of the ship in bad weather could never be kept dry. The pernicious custom, besides, of lying on deck at night even in wet weather, and of sleeping in damp clothes, in which matter seamen are so reckless, was another predisposing cause.

5. Finally, the disease proceeded steadily in its course, from the impossibility of arresting its progress by suitable remedies, there being at length neither vinegar, lime-juice, sugar, spirits, wine, nor in short any thing in the way of efficient change of diet to benefit the sufferers; and but for a liberal allowance of coffee night and morning, which fortunately happened to form part of the ship's cargo, together with the supplies opportunely received from a ship, all on board must have been shortly affected.

On the mode of treatment I have little to offer. It was entirely palliative. The bowels were particularly attended to, laxatives being given, such as castor oil, sulphate of magnesia, with infusion of senna, or the *Pulvis Jalapæ compositus.* In some cases a tonic mixture, formed of *Pulvis Cinchonæ, et Pulvis Zingiberis in aqua menthæ* was given. Vinegar, lime-juice, nitric acid, were portioned out as long as the scanty means allowed. Fomentations and blisters to the calves were tried with little or no relief. The embrocation which our means afforded was formed of cocoa-nut oil and arrack, with which the pained parts were frequently rubbed. Anodynes and diaphoretics were tried in sufficiently large doses with but temporary benefit. Gargles were formed of vinegar and water, or alum, as long as they lasted; but nothing was of avail in arresting the disease. In fact, it was not the Materia Medica which was to benefit these unfortunate people, but change of diet and the termination of the voyage;—the only check the disease received appeared after coffee began to be served out. Those who continued at duty, but who were all beginning to show the usual symptoms, by using it liberally, together with the supply of potatoes, &c. alluded to above, were enabled to keep at their duty until the ship's arrival at a port in Ireland, where she had to put in for supplies, and men to work the ship.

The benefit of the change of diet became immediately perceptible. Men, who had scarcely been able to be out of their hammocks for weeks, were seen walking about; and on the ship's arrival in the river Thames, about ten or twelve days afterwards, all were able to go on shore without assistance. This change was effected alone by diet and aperient medicine. Besides vegetables, fresh meat, &c. I supplied the people abundantly with beer and molasses. In a few days the teeth fastened; the gums became firm and healthy; the great irritation or determination of blood to them rapidly abated; the petechiæ, rigidity of tendons, &c. disappeared. In short, except in two of the worst cases, after a short time spent on shore, every scorbutic appearance was removed.

Owing to the impossibility of changing the diet of seamen, such as labour under scorbutus on board of ship, where the predisposing and exciting causes continue to operate, can never be benefited: for in this disease, whatever its proximate cause may be, there doubtless exists an acrimonious principle in the circulating blood, what in other words has been called a putrid diathesis of the fluids. To this, I apprehend, must be ascribed the morbid appearances of old cicatrices, the fœtid breath, diseased gums, high-coloured offensive urine, and more especially the violent hectic accessions. Other symptoms such as petechiæ, maculæ, and vibices may be referrible to relaxation of the blood vessels, and probably tenuity of the blood owing to debility. I was at first inclined to trace the hectic accessions, and indeed most of the symptoms to debility, as we know, for instance, in the latter stages of typhus fever hectic sometimes depends on this cause: but the analogy will not hold, inasmuch as in this latter case it is removable by wine and the diffusible stimuli; but in sea scurvy stimulants alone without change of diet have never effected a cure. The vertigo and syncope depend, I suppose, on atony or debility of the action of the heart; owing to which too little blood is sent to the brain. The hurried respiration depends on the same cause, the heart, owing to debility of action receiving blood quicker and more copiously than it was able to discharge it.

It would be wrong to conclude these remarks without enforcing the necessity of prevention. I need not observe what attention is requisite to personal cleanliness, cleaning and keeping dry the births of seamen, to ventilation, to hilarity of mind. It is highly useful also, (and in large ships I believe universally practised), to allow the seamen certain *indulgences*, as they are termed, such as tea or cocoa for breakfast; and in long voyages it may turn out a most ruinous economy to deny them the usual daily allowance of spirits to which they deem themselves entitled, and which there can be little doubt is an excellent preventative of scurvy. When denied this, the men become discontented and dispirited; they lose their usual gaiety; they mope about the decks murmuring and repining. In these circumstances, there will be seen no signs of merriment, no dancing, no singing. Their mind and body debilitated, become readily predisposed to all the ravages of scurvy, when dampness, long continuance of salt provisions, and similar accessories, fill up the train of causes. Neither ought smaller merchantmen in a voyage from India to proceed the whole passage without touching at the Cape of Good Hope or St Helena, where the people might replenish their private stores of tea, sugar, tobacco, and other similar luxuries.

I will conclude with observing, that, with attention to these and similar circumstances, I have seen voyages performed of nearly as long continuance as that under consideration, and with a ship's company of six or seven times the number, without the slightest indication of this alarming disease.

ART. IX.—*Account of an instance of Malformation in some of the Bones of the Skeleton.* By DAVID CRAIGIE, M. D.

IN September 1828, I had occasion, along with a medical friend, to inspect the body of a boy of two years and four months, who died with symptoms of pulmonary congestion. As these, however, had been obscure, it was proposed to examine the organs of the three cavities.

Before proceeding to inspect the thoracic viscera, my attention was forcibly struck by the shape of the anterior surface of the chest. On each side, instead of the usual convex swell of the ribs, there was a remarkable depression extending from the third to the seventh rib inclusive, commencing about two inches from the sternum, and extending in breadth along the chest from one and a-half to two inches. This depression consisted in each of these ribs presenting a defect of conformation from their posterior convexity to the junctions with the cartilages. At the former point each rib was suddenly bent from its normal curvature to an angular or sharp turn, as if it had been broken, and thence proceeded flat, and in some sense straight, to the cartilage, its union with which was marked by a depression and a large and evident knob or tuberosity not unlike an articulation. The deformity thus produced was so distinct, that any one would have readily pronounced it the result of a fracture. But to this idea, the circumstance of its extending through so many ribs, and being found with the same uniformity on both sides, formed an objection of some weight. To obtain some light on the matter, I removed several of the ribs, and made of these longitudinal and transverse sections. By this means the following facts were ascertained.

The bony portion of the third, fourth, fifth, sixth, and seventh ribs, underwent at the posterior-lateral convexity a sudden change of direction, so that the second or straight portion formed with the first or curved a sharp turn sufficient to constitute exactly a right angle. Longitudinal and transverse sections of these ribs showed that no breach of continuity had taken place, and, therefore, that this turn was not the result of fracture. It presented a uniform, firm surface, ash-gray in colour, and traversed, as usual, by minute red lines, yet without manifest trace of interrupted continuity. From this rectangular bend the substance of the bone was of the usual appearance, but looser and more cancellated as it approached the sternal extremity, which was large, soft, and very sectile. It was also forced inward from the cartilage, so as to form the remarkable depression observed on the exterior of the chest, while the cartilage itself projected in the shape of a large round tubercle or eminence. Nothing like false joint was observed either at the point of curvature or at the cartilages. (See Fig. 7th of Plate.)

These appearances were observed in the third, fourth, fifth, sixth, and seventh ribs; in the four last most distinctly; in the third and eighth faintly, but still sufficiently well to contribute to the general aspect of deformity on the exterior of the chest. All the ribs were soft and flexible, and spongy and sectile; and I cannot convey the idea of this condition more distinctly than by simply stating the fact, that in removing several of the ribs and making sections, I did not use the saw, but simply cut them both transversely and longitudinally. As has been already stated, they were in all respects the same on both sides of the chest.

With the exception of one or two slips of false membrane of old date, the pleura was sound, and of its natural transparency. The substance of the right lung, however, was a little hepatized in separate spots, especially through its lower two-thirds. The left lung was simply gorged, or in the first stage of inflammatory injection. The bronchial membrane was reddish; and a good deal of thin red-coloured sero-mucous fluid, somewhat frothy, flowed from the bronchial tubes.

The pericardium was thin, transparent, and of its natural appearance; and within its cavity was found about a dessert spoonful of serous fluid. The heart was sound; but the *foramen ovale* was still unclosed, and, though oblique, was large enough to admit a middle sized goose-quill.

The next peculiarity of the skeleton occurred in the skull. Upon proceeding to inspect the contents of this cavity, my attention was attracted before dividing the scalp by a deep longitudinal furrow in the situation of the sagittal suture between the two parietal bones; and another transverse one extending, though less deep, on each side along the coronal suture, between the posterior margin of the frontal bone and the anterior edge of the parietal bones. Not only was the fontanelle incomplete for about two inches; but no attempt had been made, or was likely to be made, to unite the two parietal bones with each other, and these with the frontal, by the ordinary process of dove-tail ossification. The longitudinal furrow in the situation of the sagittal suture was so large as to leave an inch at least between the parietal bones; and along this space these bones were united by firm fibro-ligamentous structure. The coronal suture on each side down to the temporal bone was so much divided in like manner, that the transverse furrow thus formed easily admitted the introduction of the tip of the finger; and the frontal and parietal bones were also united by firm fibro-ligamentous tissue. When this was inspected attentively, it appeared to consist of pericranium and *dura mater* firmly adhering, and without the smallest trace of intermediate bone. This was shown, indeed, by the state of the fontanelle, at which the pericranium adhered so firmly to the *dura mater*, that it was impossible to separate them otherwise than by the knife. This double membrane was quite fibro-cartilaginous, and was so tensely stretched between the bones, that while it was bound down in the centre to the *dura mater*, it was raised to the margins of the bones on each side of the depressed channel or *sulcus*. Much the same substance surrounded the whole parietal bones, though with less separation of the lambdoidal and temporo-parietal sutures, and with more traces of ossification. Yet so imperfect was this process, that I removed both parietal bones by strong scissors; and without using the saw, inspected the whole brain completely. The other peculiarities will be understood by a short sketch of the appearance of the right parietal bone, which is now before me.

The bone is very thin, and, in the situation of the parietal protuberance, translucent. The anterior or frontal margin presents no serrated appearance; but becoming quickly attenuated, terminates in fibro-ligamentous structure, which was leaden gray coloured, opaque, and very tough, but which has dried very hard and brittle, and is translucent and traversed by red vascular lines. At the upper-mesial extremity of this margin, the bone, instead of presenting the usual rectangular process, is very deficient, and terminates in a portion of fibro-ligamentous membrane, at least eight lines broad. The inner or mesial margin, which forms the sagittal suture, which is equally void of serrated edge, is completed by the same sort of texture; but the posterior margin, corresponding to the anterior of the occipital bone, is firmer, and presents in some parts points of ossification; and one of these is what would afterwards have constituted a Wormian bone. The inferior margin, where it corresponds to the temporal bone, is separated from that bone by a thin portion of the same membranous substance, about two lines broad, but without trace of bony matter. The bone was soft and sectile, as indeed were the bones of the skull in general; and as a proof of this, the instrument has divided the scaly portion of the temporal bone, and left it attached by ligamentous matter to the parietal.

The subarachnoid filamentous tissue was a good deal infiltrated, and the *pia mater*, especially along the superior region of the brain, was injected and vascular, its capillaries being filled with dark-coloured blood. The substance of the brain was natural in consistence. In the lateral ventricles was found a small quantity of serous fluid; and the choroid plexus was rather redder and more vascular than usual. The base of the brain and the corresponding *pia mater* was very vascular; and much serous fluid escaped on dividing the spinal chord. The cerebellum was almost natural in appearance and consistence, unless near the centre of the hemispheres, where it was certainly softer than natural. In other respects, nothing peculiar was observed.

In the abdomen the stomach was sound, and the structure of the liver and spleen natural. In the ileum, however, was found a series of six invaginations, or portions intus-suscepted within each other. The first of these, which was rather less than an inch in length, was situate about three inches from the beginning of the bowel. About six inches from this onward was a second, which was from three to four inches in length. About ten inches further was a third, two inches long; and a fourth, of the same size at nearly the same distance. Beyond this was a fifth, of nearly four inches long, with the intestine much distended with air; and about twelve inches from the end of the ileum was a sixth invaginated portion, about one and a-half inch in length.

The vermiform appendix, which was long, was attached to the peritonæum, where it passes before the right kidney.

In the colon was found one invaginated portion about two inches long, at the middle of the transverse arch.

The peritonæal surface was natural, unless that at some places it was dryer and less glistening than usual, in the neighbourhood of the invaginated portions especially. There were, however, no other traces of unsound action. The mucous surface was also healthy; but the bowels were in general distended with air.

The kidneys were natural.

The case now described, which contains several ordinary, and therefore not particularly interesting circumstances, is nevertheless important, on account of the peculiar malformation of the ribs on each side. I am indeed not aware that any instance of the same malformation has been recorded; for it is mentioned neither by Ruysch, Cheselden, Albinus, Haller, Bonn, nor by Sandifort, Portal, or any other observer. That it may have taken place, and escaped the notice of other anatomists, I am willing to admit. But I can scarcely think that it could have occurred to Sandifort without being observed by one, who has been particularly solicitous to notice all varieties of formation and structure, either recorded by others, or observed by himself. The only approach which I can find that he remarks, occurs in an instance quoted from the Anatomical Observations of Van Doeveren, who states, that he saw an example of four ribs being moveable in the middle of their bodies, and another in which he observed a similar kind of *articulation* in the sixth rib of the right, and the tenth rib of the left, side in the same subject. * These examples of malformation, however, scarcely admit of comparison with the one now mentioned.

Though the sudden rectangular turn or change of direction had at first sight the appearance of a fracture which had been afterwards consolidated, yet there was no reason to think, from the history and circumstances of the case, that this injury was the cause of the malformation. The peculiar bad configuration of these ribs had existed from the moment of birth, and appeared to have attracted little attention from the relatives. It was found, as already stated, on both sides of the chest; and it was impossible, in making sections of several of the ribs, to discover any of those marks by which the existence of a previous fracture is recognized.

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* Ed. Sandifort, Observationes Anatom. Lib. iii. cap. x. Lugduni Bat. 1779.

On the cause of this peculiar deviation of figure, I feel incompetent to offer even a conjecture. The subject was an illegitimate child; and it was impossible to procure creditable information, or information even of any kind from the mother. The relatives, however, stated, that, in the anxiety to conceal the change of shape which she underwent in the course of pregnancy, she might have employed more forcible means of compression than was compatible with the safety of the infant. I doubt whether any compression applied to the belly can operate through the abdominal muscles, the uterus, and the membranes, in producing any definite change upon the fœtus, more especially with such accuracy as the malformation now described implies. At the period of pregnancy at which such compression is most likely to be applied, it is to be remembered, that in by far the majority, if not all the cases, the head and chest are the most dependent, and, therefore, completely sheltered from the effects of violence. It is to be added also, that any violence of this kind, or any compressing force, is more likely to kill the child outright, than to inflict an injury so definite in character as this here noticed. The only mode in which it is barely possible to imagine the malformation to result from this cause, is by supposing the compressing force sufficient to urge the body of the child against its arms, which, if folded, as sometimes happens, close upon the chest, may have bent the ribs inward so considerably, as at length to produce the degree of incurvation noticed. Though I give this as a possible occurrence, I admit that it appears so little probable, that I cannot attach to it any weight whatever. In the fœtus, we know that the bones are occasionally so flexible, as to yield with facility to a slight force, applied during pregnancy, or in the course of parturition, and yet recover their natural shape and direction after birth.

It may be further remarked, that the peculiar configuration of these ribs may be ascribed by some to the *rachitic diathesis.* This I have no means either of refuting or denying; and though the state of the cranium is rather favourable to this view, the total absence of any rachitic change in the other pieces of the skeleton furnishes little ground for maintaining it. Upon the whole, the change now described is one on which we cannot form certain inferences without a few more examples of its occurrence.

I was desirous to ascertain from the sister of the mother, whether the respiration of the child appeared at any time to be constrained by the shape of the chest. Upon this point, however, she was unable to communicate satisfactory information. She stated in general, that the child seemed to require to be seated constantly on the knee of the nurse, or of some person who could show the same attention, and bestow similar cares, and that he never showed any inclination or power to use his legs. But though she admitted that he seemed distressed and in pain, she was unable to specify wherein his distress consisted. The respiration was described as languid and oppressed.

The state of the cranial sutures is less uncommon than that of the ribs. For I believe it may be regarded as a variety of that malformation which has been distinguished by some authors as *opening* of the sutures. Portal especially, in speaking of the occurrence of this phenomena in young subjects, remarks, that though rare, it is occasionally observed to the age of two or three years; but adds, that at a more advanced age it is uncommon to find the sutures separated, in consequence of the operation of an internal cause.*

The peculiar formation above described, however, I do not conceive can be justly imputed to this cause. Though consisting literally in separation of the sutures, the appearances which I observed in the cranium of this child lead me to doubt whether they had ever been completed,—or, to speak more accurately, whether the cranial bones had ever been more approximated than at the period of death. It has been generally, and rather positively, maintained by those who ascribe the open suture to forcible separation, that it is the result of the distending force of the contents of the skull, when enlarged by the progressive increase of hydrocephalus. This doctrine is plausible and easily understood, in so far as it is entirely mechanical. In the case under consideration, however, though a little fluid was found in the ventricles, that was totally inadequate either to extrude the brain, or distend its osseous case to separation; nor, it is to be observed, were the ventricles themselves so much enlarged as to imply much distension. In point of fact, I have several times seen much greater quantities of fluid in the brain, even in young subjects, without the smallest yielding of the cranial bones or parting of their sutures.

It is more consistent, I imagine, with what is known and observed of the phenomena of growth in animal bodies, to regard the condition of the cranial bones now under consideration, as the result of interruption or suspension of the progress of ossification. It is well known that these bones enlarge by the successive accretion of matter to their margins, while, at the same time, a process of moulding or modelling goes on from the centre by a simultaneous and alternate deposition and absorption. In instances of the kind before me, the first process seems to receive a sudden check or interruption at a certain stage of its advancement; and the *pericranium* and *dura mater*, which are hitherto the main agents of ossification, instead of continuing to deposit bone form mutual adhesions, and become consolidated into a firm fibro-cartilaginous membrane. Why both were so much depressed between the bones, I am unable to explain, unless by referring it to the unyielding nature of the *dura mater*, by means of which the pericranium was held down to the centre of the furrow, while its margins were raised by the cranial bones. It is farther not improbable that some variety of the inflammatory process taking place between the corresponding surfaces of the *pericranium* and *dura mater*, may have operated as an exciting cause to interrupt the healthy action and effect the subsequent adhesion.

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* Anatomie Medicale, Tome i. p. 96.

Had the child lived, it is not improbable that the fibro-ligamentous membrane would have eventually undergone that variety of ossification which is proper to such tissues, and that no trace of sutures would have remained, unless perhaps, in a slight depressed line. The circumstances of this case, indeed, appear to me to justify the inference, that in this manner several of these crania without suture, mentioned by Zinn, Berger, Hunauld, Van Doeveren, Scherer, and Sandifort, were completed. In most instances, unquestionably, obliteration of the serrated junctions of the cranial bones is the result of the advanced stage of natural ossification. But as in some instances fibro-ligamentous matter appears to undergo a peculiar species of ossification, it is not unreasonable to infer, that in the present this might have proved the ultimate result.

ART. X.—*Case proving the existence of a cuticular covering over the Human Cornea.* By ROBERT SPITTAL, Esq.

WE owe much to comparative anatomy for the elucidation of many obscure points in the anatomy of animals; for while in one we find an organ indistinctly developed, in another animal of a different character, we frequently find the same organ in a high state of developement, and thus we are enabled to conjecture the true structure, use, and importance of such a part, where obscurely marked.

In many cases, this reasoning from analogy is quite sufficient to determine the structure or function of a part; but it is always more satisfactory when the existence, structure, or function of any organ can be made out in the animal to which it belongs; and it is here that pathology comes to our aid. Many obscure points in human anatomy, by its assistance, have been satisfactorily established. The object of the following case is to prove, by a similar aid, what is generally believed to be true; but the arguments in favour of which have chiefly been drawn from well known facts in the lower animals,—namely, the existence of a cuticular covering over the human cornea, continuous with, and analogous to, that general investing membrane.

A. F. a young man, aged 21, received a severe blow when eight years old, with a stick, on the left temple, which caused fracture of the upper and outer side of the orbit, without wounding the integuments. Considerable inflammation of the fractured and contused parts ensued; abscesses formed between the fractured portion of orbit and eyeball. These burst externally, and continued to discharge for a considerable time; but as that process ceased, and the parts began to cicatrize, the eyelids became retracted and everted, particularly the upper, so that they gradually became unable to perform their proper functions, and in consequence the eye was left constantly exposed to the air.

The effect was to be anticipated. The surface of the eyeball lost its lustre, gradually became dry and dim, and vision became impaired. The parts completely cicatrized, and the dimness of vision gradually increased for several years, so that he could only distinguish very bright objects.

Such, then, is a sketch of the history of the case; and I shall now describe the appearance of the eye as it was about a year ago, when I first saw the man.

On drawing the finger along the orbit, the portion which had been fractured was quite evident, together with the cicatrix mentioned. The upper eyelid was so much everted, that its inner surface, and nearly the whole of the anterior part of the eyeball, were exposed, protected only by a most distinct cuticular covering, through which the iris and pupil were very indistinctly seen. The cuticle was continuous with that covering the inner surface of the eyelids, passed completely over the surface of the eye, and was not bound down in any way at the line of junction between the cornea and sclerotic coat, but was evidently quite continuous over the whole surface, from the corrugations noticed on the motion of the eyeball; and indeed, with the finger it could be made to move slightly over the subjacent parts. The cuticle was fully more distinct than that on the external parts of the lips, and its opacity alone caused the impaired vision.

The man was a patient of Mr Liston's, and applied to him on account of the deformity, which Mr Liston to a great extent remedied, by removing an angular portion of integuments at the outer angle of the eye, and then bringing the eyelids closer to each other. By this operation the eversion was nearly cured, but still the surface of the eyeball was left very much exposed; and, though the deformity is now much removed, the cuticular covering is nearly as before.

This case proves, I think, to demonstration, the existence of a continuous cuticular covering over the human cornea,—an anatomical fact, which, as before stated, has been generally believed, but seldom demonstrated. Here, in consequence of the pathological state of the organ, the epidermic covering has been highly developed, so as to serve as a protection to the delicate parts beneath.

May 14, 1829.

ART. XI.—*Observations on the Bark of the Root of the Calotropis Mudarii.* By ANDREW DUNCAN, F. R. S. E. Professor of Materia Medica in the University of Edinburgh. To which are subjoined *Observations on the Bark of the Calotropis Gigantea of the West Indies.* By ——— LYON, Esq. Staff-Surgeon.

THE drug which is the subject of the following observations has been called Madár by Mr Playfair, and Mūdar by Mr Robinson, Dr Ainslie, and Dr Wallich, being its Hindostanee name, with different orthographies. I have preferred *Mudar*, as being most distinct from *Madorius*, the name given by Rumphius to a different species of the same genus. From my ignorance of the eastern languages, I cannot venture to quote the other synonyms given by Dr Ainslie under the articles Yeroocum Pawl, (Mat. Ind. Vol. i. p. 486,) and Yercum Vayr, (Vol. ii. p. 488,) for although some of them are probably correct, it is equally probable that several species of *Asclepias* are confounded together, which is not surprising, since scientific botanists have by no means determined their diagnosis.

The first notice of the Mudar of Hindostan, as a native remedy, was communicated by Dr Whitelaw Ainslie.[*] It has become more extensively known by the observations and recommendation of Mr George Playfair.[†] Further accounts of its good effects have been since published, as observed in India, by Mr Vos, * and in this country by Mr Cumin. †

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[*] Materia Medica of India, 4to, Madras, 1813.—See pp. 127, 128.

[†] On Elephantiasis as it appears in Hindostan. By James Robinson, Esq. in Medico-Chirurgical Transactions of London, Vol. x. p. 31. 8vo. London, 1819.—

By almost all the writers on the subject, it is said to be the root of the *Asclepias gigantea.* But this is a mistake. Dr Francis Hamilton has, in his learned commentary on the Second Part of the Hortus Malabaricus, ‡ described the species of the genus *Asclepias*, L. *Calotropis*, Brown, § which he found in India. They are three in number.

Calotropis gigantea is the *Ericu* of the Hortus Malabaricus, the *Madorius* of Rumphius, the *Akhund* of the Hindoos.

To the second he gives doubtfully the trivial name of *procera*, as if uncertain whether it were the very species described by Willdenow, which is indigenous in Persia. It would appear that he afterwards considered them as distinct species, and gave to the Indian plant the name of *Calotropis Mudarii.* It is the Mudar of the Hindoos. The more detailed description inserted in Mr Playfair's paper is also by Dr Hamilton.

But the most accurate botanical information concerning the plant which furnishes the Mudar, as to its diagnosis from *C. gigantea*, is contained in the printed circular notice of the proceedings of the Calcutta Physical and Medical Society for March 1824. For a series of these very interesting papers, I am indebted to the kind attention of Dr Adam, secretary to the society.

Dr Wallich, we are there told, exhibited specimens in full flower of the varieties of the Asclepiadæ, termed by the natives Mudar and Akhund, and explained to the meeting the characters which distinguish each. The former is the genuine plant described by Mr Playfair, as useful in elephantiasis and other cutaneous affections. It is a small plant, having a perennial root, but an annual stem, while the Akhund (both the purple and white flowered) attains comparatively a great height, and is altogether perennial. The flowers of the Mudar form a cup-like corolla, while these of the Akhund are reflected on themselves. The Mudar is not found indigenous below the province of Behar, and affects chiefly dry sandy soils ; while the other variety is common all over the country, and flourishes in great perfection in Bengal proper. Dr Wallich concluded by observing, that

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On the Madâr and its Medical Uses. By George Playfair, Esq. with a plate, in Transactions of the Medical and Physical Society of Calcutta, Vol. i. p. 77. 8vo. Calcutta, 1825.

* Calcutta Transactions, Vol. ii. p. 409. Calcutta, 1826.

† Edinburgh Med. and Surg. Journal, Vol. xxviii. p. 295, 8vo. Edin. 1827.

‡ Transactions of the Linnean Society, Vol. xiv. p. 238, 4to. Lond. 1823.

§ On the Asclepiadeæ, a natural order of plants separated from the Apocineæ of Jussieu. By Robert Brown, Lib. L. S. *See* Memoirs of the Wernerian Natural History Society. 8vo. Edin. Vol. i. 1811, p. 12.

nothing can be more distinct in habit, duration, and flower, than these two plants.

It is much to be regretted that Dr Whitelaw Ainslie, in his last work,* should have again represented the *Asclepias gigantea* as the true Mudar plant, and as different from the Akhund, as in both respects he is at variance with Dr Hamilton and Dr Wallich, and it becomes exceedingly doubtful to which of the species his observations refer.

The *Calotropis acia*, the third species of Dr Hamilton, is an herb-like plant, much smaller than the others. It is very common in India, and well known by the name of *aki*. It does not seem to be used in medicine.

The root of the Mudar is perennial, perpendicular, fusiform, branched, nearly round, surmounted by a thicker head, from which several stems ascend. In the largest specimen which I possess, the rhizoma where it begins to taper is 1½ inch in diameter; at the lower extremity, where it is broken off, about nine inches from the head, it is reduced to half an inch. The form of the head is irregular, diameter varying from 2¼ inches to 1¾. The number of stems about twelve, besides several much smaller. The diameter of the largest of these stems does not exceed half an inch.

The epidermis of both root and stems is of a pale fawn-colour, or yellowish brown; the surface is fine-wrinkled longitudinally, and covered with a dry brownish powder which soils the fingers. It is very thin, and adheres closely to the bark. The bark of the stems is very thin, and darker coloured than the wood, which is pale yellow, and of a close texture. The stem is hollow down to its origin from the head.

The bark of the root is thicker in proportion, easily separated from the wood, and of a very white colour. The wood of the root is rather darker coloured than that of the stem, denser, and the root is solid throughout.

To prepare the Mudar powder, the roots are dug from a sandy soil in April and May. They are then well washed in clean water, and afterwards thoroughly dried by wiping them with a cloth. After this, they are allowed to dry in the open air so far that the milky juice shall become somewhat inspissated, and not flow in the subsequent part of the operation. The brown epidermis is then to be scraped off, and the bark left uncovered and white. The bark is now to be sliced or torn off, and dried for use.

When reduced to powder, it must be preserved in bottles well corked, as it is apt to attract moisture in India, for I have not found it to be the case in this country.

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* Materia Indica, 2 Vols. 8vo. London 1826. See Vol. i. p. 486, vol. ii. p. 476—488.

The powder of Mudar is of a pale fawn colour, with scarcely any, or a very faint, smell, and of a bitter slightly nauseous taste.

The chemical experiments which I have made with the Mudar powder sent to me by Dr Adam are, perhaps, sufficient to indicate the nature of its predominant principles, though far from amounting to a complete analysis.

Five hundred grains of the powder were infused in 9 oz. of cold water. On agitation, the mixture was covered with a very durable, or rather permanent, white froth, which dried on the surface without subsiding. Next day, the infusion was decanted, and filtered through paper. It passed slowly, was perfectly transparent, of a pale sherry wine colour, and frothed much and durably on agitation. On the following day, it was tried with a variety of tests. It slightly reddened paper coloured with litmus. It did not affect turmeric paper, or a solution of tartar emetic. Its transparency was slightly disturbed by *aq. ammoniæ*, a solution of salt of tartar, lime water, dilute sulphuric acid, and a solution of corrosive sublimate. The tincture of permuriate of iron had at first no effect, but, on standing, a copious precipitate fell. It was immediately and abundantly precipitated by solutions of acetate and of sub-acetate of lead. Lastly, the tincture of nutgalls instantly produced a copious white curd.

After the first infusion was decanted off, the same quantity of water was repeatedly added, to extract all that was soluble in cold water. But to this mode of analysis a limit was put by the mixture very soon getting into a state of fermentation.

The cold infusion was put into a vessel, and heat applied Before boiling, and when it had reached the temperature of 160° Fahr., coagulation began, indicating the presence of vegetable albumen, and at last a very dense scum was formed, which floated on the surface. When the boiled infusion was filtered, it was perfectly transparent, but had acquired a considerably deeper colour.

Two thousand grains of Mudar was infused in successive portions of spirit of wine, sp. gr. 826, until 88 oz. were employed. It dissolved about 308 grains, and left 1692 undissolved. The mixed tincture was at first transparent, of a pale wine yellow colour, and very bitter taste, but afterwards became slightly turbid. The alcohol was partly drawn off by distillation. The distilled spirit had no peculiar smell or taste. It was not impregnated with any volatile principle.

The residuum of the distillation on cooling deposited grains of a white substance, from which the fluid was poured off, and evaporated to dryness.

The resinous matter deposited from the evaporated tincture on cooling had a very singular appearance. It concreted into what might be called distinct semilenticular masses, of a white colour, and apparently waxy consistence. For some time they also had a waxy translucency, but gradually assumed a chalky whiteness on becoming thoroughly dry. This substance had no taste or smell.

Cold water had no action upon it; but, on raising it to 212°, it was imperfectly melted, and rose to the surface, on which the resin concreted on cooling.

When exposed dry to a temperature above 212°, it was liquefied, acquiring a brown colour and transparency, and burnt vividly.

Cold alcohol had little action upon it, but on raising it to the boiling point, it was entirely dissolved and separated again on cooling.

Sulphuric ether first rendered it yellow, and then dissolved it, but the solution remained milky.

It was slowly dissolved in cold naphtha of pit-coal, more quickly and abundantly in hot naphtha, from which it partly separated on cooling.

Oil of turpentine rendered it yellow, and dissolved it.

Olive oil dissolved it entirely by the aid of heat.

Strong sulphuric acid acted immediately upon it, and formed a deep red solution.

Water of caustic ammonia and solution of caustic potass or soda scarcely acted upon it.

The extract obtained by evaporating the tincture from which the white resin had separated was of a brown colour, somewhat translucent, slightly deliquescent, and had an intensely bitter nauseous taste. It appeared to me to be very analogous, if not identical, with Emetine. If they should be found to be different when purified, it may form a new principle, and, for convenience, I shall provisionally call it *Mudarine*. *

The residuum remaining after the action of the alcohol, was infused with repeated quantities of cold water, and the solution decanted and filtered. The infusion had a pale yellow colour, frothed very much on agitation, but did not coagulate on being boiled. When evaporated to dryness, about 160 grains of a bitter dry brown mass was left, which, on standing, attracted moisture, and became like treacle. In hot water it was very soluble.

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* Since this paper was sent to press, I have extended my experiments on this substance, and have discovered it, in its impure state, to possess the very singular property of being soluble in cold water, and gelatinizing when the solution is heated to 85° or 90° Fahr.

After cold water had ceased to act upon the residuum, it was boiled with water. The decoction was thick, and acquired a deep blue colour from tincture of iodine. It could not be filtered, and the proportions of starch and insoluble woody fibre were not ascertained.

The bark of the Mudar root, according to this analysis, contains,

1. An extractive matter, (Mudarine,) soluble in alcohol and in water, which is probably its active constituent; about 11.5 *per cent.*
2. A resin remarkable for its requiring a temperature of at least 212° for its liquefaction, and for its little solubility in cold alcohol; about 4 *per cent.*
3. A gummy matter, probably not freed from extractive; about 8 *per cent.*
4. Starch in considerable quantity.
5. Albumen.
6. A little fixed oil.
7. Vegetable fibre.

It contains no volatile oil or other volatile principle.

In the native practice of India, the powder of the bark of the Mudar root, as well as the concrete juice of the plant, enters into various compound formulæ for the cure of elephantiasis and many other disorders.

I have made many trials with it in the Clinical wards of the Royal Infirmary, and have satisfied myself that, in every respect, its action is so similar to that of ipecacuan, that even in European practice, and still more profitably in that of India, the Brazilian root might be altogether dispensed with, and the Mudar might be rendered a profitable article of exportation from our eastern empire.

My first experiments of its medicinal powers were made in cutaneous diseases. In some of these, especially in a case having some resemblance to the *Elephantiasis anaisthetos* of Mr Robinson, in which he found it so successful, it failed altogether, either from the incurable nature of the affection, or my want of skill in administering it. In others, especially various forms of Psoriasis and Lepra, the complaint has generally yielded while the patient was taking the Mudar. The most remarkable of these I subjoin nearly in the words in which it is recorded in the Journals, in order to give a just idea of the severity of the complaint, and of the action of the remedy.

"Catherine Townly, servant, æt. 17. 30th November. There is a scaly eruption of different degrees of intensity, situated on the forehead, temples, scalp, fore-arms, and knees.

"On the forehead and temples it consists of circular spots, varying in size from a minute speck to nearly an inch in diameter; the smaller being merely elevations of the cuticle, red, glossy, and round, and the larger covered with whitish scales. The entire scalp, particularly towards the vertex, is coated with thick prominent circular crusts, composed of collections of dry scales.

"On the upper and back part of the left fore-arm there is a large triangular patch about four inches in length, the base extending from the olecranon to the outer condyle of the humerus, the apex pointing on the shaft of the ulna. Its surface is partly scaly, but red and hardened where scales have been detached; it is intersected by transverse fissures, and its outline is formed by the segments of several circles which have spread into each other.

"Between this and the radius there is a similar patch of smaller size. Above the wrist there are two remarkable spots, the larger an inch in diameter, red, shining, scaly, and having an elevated regular edge.

"On the right arm, both knees, on the left leg, and outer side of right thigh, the disease exists with the same characters, but to less extent. There is one spot also on the left upper arm, and another on the back of the neck.

"In all places it is constantly itchy, but free from pain on pressure or increased heat. A bloody serous fluid is occasionally discharged from the different fissures, and at present from an abraded surface on the right knee.

"The disease is imputed to exposure to changes of temperature in a heated kitchen, and first appeared eight months ago nearly at the same time on the face, scalp, arms, and knees, in the form of small red spots, which gradually became larger and scaly.

"In June she was admitted into the country ward, and treated principally with baths, dulcamara and pitch applications, under which the eruption faded from the face, and the large spots desquamated from the centre, leaving a red marginal ring; but the affection of the scalp increasing obstinately, she was dismissed in six weeks.

"A fortnight after dismissal the spots on the face returned, and the disease gradually assumed its present appearance.

"One of her sisters has been similarly affected for four years. Functions are all natural, and the skin in other situations soft and moist."

She was directed to have a tepid bath every second evening, and to take three grains of Mudar powder three times a-day. Next day the dose was increased to five grains three times a-day. After the first bath the desquamation began to increase considerably. On the third the leprous spots were reported to be sore and cracking. On the fourth she began to have nausea from the use of Mudar, which was afterwards kept up in a greater or less degree. She now also sweated much after the baths.

On the 6th her hair was cut out, and the eruption on the head was then observed to consist of round distinct crusts, the larger about half an inch in diameter. On the face the eruption was desquamating, but on other parts of the body it was disposed to crack, and was very itchy. She had also some febrile symptoms. Her pulse was sharp and frequent, and her tongue furred and tremulous. Sixteen ounces of blood, quite healthy in appearance, were drawn from the arm, and the eruption on the head was directed to be rubbed with *Linim. aq. Calcis*, which she applied also to other parts of her body, as she felt benefit from it.

On the 7th, the Mudar was directed to be increased to seven grains for each dose. The nausea, which had declined, was renewed, the sweating increased, the eruption continued itchy, but the skin was less red where the scales had fallen off.

On the 12th, she was directed to take seven grains, four times a-day; under this increased dose the improvement was progressive.

On the 19th, the Mudar caused vomiting. The dose was diminished to five grains.

On the 20th, with the view of increasing its diaphoretic effect, and to check its tendency to produce vomiting, I suspended the simple Mudar powder. I prescribed a scruple with a grain of opium, to be divided into three doses, to be taken during the day; but each dose produced vomiting.

On the 22d, I combined nine grains with one of opium, and gave it as before, but still vomiting was excited.

On the 23d, the simple powder was resumed, which did not vomit. On the 25th, it was combined with Lupuline; but this also disagreed, and from this time the simple powder alone was given internally, along with the tepid bath and the *Linim. aq. Calcis* externally. Under this treatment the amendment was rapid, and on the 19th of January 1829, she was dismissed with very little traces of Lepra, either on the head or body, while no appearance of fresh eruption had taken place for a considerable time past. She had not been so well since the first appearance of the disease.

I am inclined to think that the extent, and promising durability, of the recovery were owing, in a considerable degree, to the Mudar; because the disease did not give way during her first residence in the hospital, to baths assisted by other powerful remedies. The action of the Mudar on the skin was evinced by the increased irritability and tendency to crack of the scaly spots, as well as by the nausea and sweating induced. Vomiting was excited in this case by seven grains of the powder.

Partly from the vomiting unintentionally induced in several of these cutaneous cases, and partly from the analogy with ipecacuan, discovered by its analysis, I now gave it in a variety of diseases, where I would have prescribed ipecacuan as an emetic. In doses of from fifteen to twenty grains, it rarely failed to produce full and easy vomiting.

In smaller doses, of from 3—5 or 7 grains, repeated three times a-day, it produced more or less of nausea, with occasional diaphoresis or sweating; and given in this way, it was most successful in cutaneous affections. Its sudorific action was much assisted by the tepid or warm bath; and in painful affections of a rheumatic nature, by combining it with opium, in the proportion of one grain of opium to five or seven of Mudar.

It is in the like proportions, also, that I frequently combine ipecacuan with opium, and with manifest advantage; for the excessive proportion of opium in the officinal *Pulv. Ipecac. comp.* prevents us from exhibiting a sufficient quantity of the ipecacuan to have all the effect, as a sudorific, which it is capable of producing. My view is, that they should be combined in the proportion of a full narcotic dose of opium, with a full nauseating dose of the emetic. The quantity of sulphate of potass to be added is indifferent.

In still smaller doses Mudar acts as an expectorant, or as a tonic and stomachic. I have not observed it to act upon the bowels as a cathartic.

As we might expect, a wine made with Mudar acts exactly as *Vin. Ipecacuanhæ.* Of this, however, I have assured myself by clinical experiments, and I have ascertained that half an ounce sometimes excites vomiting, and that a repetition of the dose almost certainly does.

I have also tried the principle similar to Emetine soluble in alcohol and in water, or Mudarine. The first time I gave it, one grain produced vomiting. On the last occasion, this effect took place with the third dose of one grain each.

My experience thus establishes the analogy, if not the perfect identity, of Mudar with ipecacuan as a therapeutical agent.

The Mudar plants and the allied species yield much milky juice, which, when carefully dried, is considered by the Hindoos as powerfully alterative and purgative, and has been long used as an efficacious remedy in the Lepra Arabum, the dose being about the quarter of a pagoda weight in the day, and continued for some weeks.

Dr Ainslie observes, that in lower India, where he resided many years, he found the simple dried juice considered as infinitely more efficacious than the bark of the root, and that later communications from the East confirm him in that opinion. Notwithstanding this authority, and although I have never seen the concrete juice of the Mudar, yet, judging by analogy and chemical analysis, I am disposed to think that the bark will be found more active than the concrete juice. We have indeed no analysis of this substance itself; but Dr John of Berlin has analyzed the milky juice of the *Asclepias Syriaca.** He found it to consist of water, 73; resin, 26.5; elastic substance, (caoutchouc,) 12.5, vegetable gluten, 4; extractive, 4; tartaric acid and albumen inappreciable = 120. From the same experiments it appears that the resin in the milky juice of the Asclepias Syriaca, has much analogy with that extracted by me from the bark of the Mudar. He pointed out its remarkable infusibility, as it did not change its state of aggregation in boiling water, and melted only at a higher temperature. It also resembled the Mudar resin, in being very soluble in boiling alcohol, and separating almost entirely from it on cooling, in the form of a white granular friable substance. It differed, however, in some respects, especially in being more soluble in caustic alkaline solutions. By analogy, it is probable that the concrete juice of the Mudar consists chiefly of an inactive resin.

On the other hand, from my experiments it appears that the extractive (Mudarine) is the active principle upon which the emetic and other virtues of the Mudar depend; and as it is probable that it exists in the bark in much larger proportion than in the concrete juice, the former will be in the same proportion more powerful in its medicinal action.

This conclusion is also supported by the analysis of the root of the *Asclepias Vincetoxicum* by Feneuille,† who found in it a principle soluble in water, alcohol, and etherized alcohol, without any sign of alkalinity, its solution in water not disturbed by acetate of lead, but precipitated by the subacetate, permuriate of mercury, and infusion of galls. In a dose of three grains it caused general uneasiness followed by nausea and vomiting, and in a smaller, a slight irritation of the stomach followed by sweat, and afterwards by alvine evacuation. Feneuille considers it as an emetic principle different from emetine. The difference, however, is slight, and, as well as Mudarine, it may be considered as a mere variety of emetine. It is now time to attempt to diminish the number of vegetable proximate principles, to which the activity of modern chemists is daily adding, by grouping together analogous substances into species and genera; and in this spirit, Dr Buchner proposes to retain the term *Emetine* for the genus, and to add the distinctive appellation for each species: thus he calls the *Violine* of Boullay, *Violo-emetine.*[*]

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* Chemische Untersuchungen mineralischer, vegetabilischen und animalischen Substanzen, 8vo. Berlin, 1810, p. 30.

† Journal de Pharmacie, Tom. xi. p. 305. 8vo. Paris, 1825.

Although botanists have sufficiently established the specific difference between the plants called Mudar and Akhund by the Hindoos, they are still nearly allied species, and probably do not differ much in their medicinal action. The latter, the A. or C. gigantea, was described by Van Rheede,[†] under the title of Ericu. He tells that its decoction made with oil is of use rubbed upon parts affected with gout; that its root in decoction is useful in cold fever, and in the swellings of women after parturition; and that, applied as a lotion to the part bitten by the *Cobra capella*, it is serviceable; that merely chewed it allays toothach; and that the expressed juice of the leaves boiled with oil, and applied to the part, relieves gouty pains, which is also done, if the leaves immersed in oil, and heated at the fire, are laid on.

Rumphius describes it under the name of Madorius, or Madori.[‡] He says it is an exotic in Amboyna, and was imported from Bima, where it is indigenous, as well as in Baleya and Java; and he tells us, that in Bima it is considered as an excellent antidote against the bite of poisonous serpents, for which purpose it is chewed, the juice is swallowed, and the masticated root applied to the wound. He adds, that he would not recommend this practice to an European, as its milk is suspected, having a very unpleasant taste, and producing vertigo and nausea.

This species seems also to be naturalized in the West Indies. At least Browne[§] says that it is *now* common in all the Savannas about Kingston and Old Harbour, and gives it the English name of Auricula or French Jasmin. I do not, however, find it described by Descourtilz[‖]. This I am rather surprised at, as it seems to be much used as a medicine in the French West Indies. The following valuable communication, with which I was favoured from Mr Lyon, staff-surgeon, confirms my opinion concerning the similarity of effect of the two species of Asclepias or Calotropis, the gigantea and Mudarii, and will form an appropriate conclusion to these observations.

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[*] Repertorium für die Pharmacie, B. xxx. p. 48. 12mo. Nürnburg, 1829.

[†] Hortus Malabaricus, Pars IIda. Folio. Amstelodami, 1679. P. 53, t. 31.

[‡] Herbarium Amboinense; Auctuarium. Folio. Amsterdam, 1755. P. 24, t. 26. f. 1.

[§] The Civil and Natural History of Jamaica. Folio. London, 1756. P. 182.

[‖] Flore Medicale des Antilles, 8vo. Paris, 1821, &c.

"My Dear Sir.—After looking over some papers, among which I was in the habit of keeping my notes connected with the operations of medicines, &c. I regret to say I have not been able to lay my hand on a single observation connected with the history of the introduction of the Mudar root of the East into the West Indies. But it is distinctly in my recollection, that I put the question to Mr Krous, a practical botanist of great intelligence, and who has made himself extensively and intimately acquainted with the history and medicinal qualities of the plants of the West Indies, whether the plant he called Asclepias Gigantea was that which the East Indians called by the name of Mudar root, and whether it was indigenous to the West Indies, or only introduced? His reply was, that it was introduced; and, if I mistake not, he said it was introduced there, not from the East Indies, but from South America, where he stated that he had met both with it and many of its varieties. I may now add, in corroboration of the plants not being indigenous, that it is not to be found in any part of the Island of Dominica that has not been in a state of cultivation, or the site of a garden. It is an highly ornamental flower, nearly semperflorens; but the stem, which rises to the height of nine or ten feet, and which is luxuriant for the first year or two of its growth, is liable to suffer decay in many of its branches,—a circumstance to which, as well as to the increasing poverty of the island, I may attribute the almost utter neglect into which it has fallen; for although it is a plant, which, when once introduced into a piece of garden-ground, extends itself rapidly by luxuriant suckers, yet it is so scarce, that Mr Krous finds it difficult to obtain as much as is necessary to supply his demand, without committing depredations on some of his neighbours' property. The plant goes also by the name of milk weed, cotton weed, and bladder weed, from its large green vesicular capsule, which has a great resemblance to an enlarged scrotum. It seldom ripens its seeds in Dominica, and, I believe, is never propagated by seeds there, which accounts for its not extending itself beyond the limits already mentioned. This plant is much less extensively known in the English than in the French West India Islands,—a fact not only applicable to this, but also to almost all the medicinal plants of those luxuriant islands; as, for instance, there is hardly a creole of Dominica or slave who is not acquainted with a number of powerfully active emetics, purgatives, sudorifics, tonics, demulcents, and emmenagogues, or who hesitates for a moment to recommend them to their sick friends; whereas you hardly meet with a person in Barbadoes, or any other truly British island, who extends his botanical knowledge beyond a sugar-cane, yam, coffee, cotton, and the like. Professional men are generally exceedingly inattentive to the powerful agents which nature strews around, and, I fear, unjustly confident in the greater medical virtues of the chemical agents, and the too generally old and deteriorated drugs which are furnished them from the British markets.

My attention was first called to the medical virtues of this plant by Mr Krous, who stated that he used it as an emetic instead of ipecacuanha, and that it was of great benefit in phthisis, diseases of the skin, and especially elephantiasis; in short, Mr Krous used it as a general remedy as extensively as his European friends use calomel, probably with as much good, and certainly without doing much injury, as far as the medicine was concerned. The roots, from 1 to 4 or 5 inches in diameter, are taken up from the month of November to April, and deprived of their bark. This is the medicinal part, and is of a whitish colour, succulent nature, and short in its fracture. It may or may not be deprived of its epidermis; but that which I have used has undergone no such operation. It is to be cut up into small pieces of about a drachm each, and exposed in the shade to a free current of air to dry. It pulverizes freely, and may be kept in the state of powder, like ipecacuanha. It is not liable to lose its virtues, although a prey to insects, nor by two years keeping. Some of it has been that length of time in my possession. It may be used either in form of powder or infusion; the powder may be taken like ipecacuanha, from 10 grains to ʒj. for an adult as an emetic. The infusion is generally made by pouring upon 3 drachms of the coarse root, or its powder 8℥. of boiling water, and when cold strain, 2 to 4℥. of it act as an emetic. I generally gave this infusion combined with tea, or milk sweetened. It is more easily taken than ipecacuanha by children; and in my own family I have made use of it constantly as an expectorant with the most decidedly beneficial effects. Its action is much more powerful in some constitutions than others; for instance, on my boy $3\frac{1}{2}$ years old it used to act as an emetic, and produced great paleness of the surface for a considerable time,—in the case of my daughter $2\frac{1}{2}$ years old, the same dose hardly acted. As emetic, I used it myself, and found that it excited active vomiting; but it was so different from the sickness I experienced from ipecacuanha that I was enabled to put down my feelings, as follows: About two hours after breakfast upon tea and toast, took 4℥ of the infusion; in half an hour nausea; in forty minutes after, a copious flow of saliva into the mouth; and in forty-five minutes, vomiting and free perspiration over the body. The quantity of ejected matter was small, acid in its nature, and effervesced strongly with carbonate of soda; little or no depression of spirits or feebleness; fifty-five minutes ejection of yellowish and sweetish bile; one hour eighteen minutes, vomiting; heart palpitating, or rather bounding; pulse rapid and intermitting; one hour and forty-three minutes nausea gone, and stomach active. From its action upon myself, it appears to me evident, that it has the power of relaxing the skin, and increasing the secretion of the saliva and bile, which latter, from its very bitter sweet taste, and yellow colour, I am persuaded, was direct from the liver; bowels not disturbed. The second and a third infusion act nearly as powerfully as the first; and a third, according to Mr Krous's account, serves him as his best purgative, which is a singular enough fact, when we find the stronger infusions taken without the purgative property being recognizable. He has used the powder in cases of Lepra vulgaris, psoriasis, and elephantiasis. In the former cases it is extensively used, and he states with constant success; but in those cases in which it was tried by me, it was not so successful,—indeed it failed after affording a temporary relief, although it had been used for a long time. I directed its use to a greater extent in cases of elephantiasis. One was that of a military labourer, his father an African similarly affected, who had been taken into hospital from his sequestered hut, for the purpose of giving him the benefit of a fair trial of this medicine. When he was admitted his face and ears were tubercular, his nose flattened, his voice nasal,—a complete case of leontoasis,—his legs tumid, the glands in groin tumid, and several deep-eating ulcers, called * tubbors, in the soles of the feet, and on the toes and fingers, which discharged a fœtid thin sanies. The belly was tumid and rough, his skin scaly, except on the part about to run into ulceration, which was of a silky smoothness.

" This man took to the extent of eight grains three times a-day for three months, seldom evincing any sickness of stomach or alteration of appetite. The tubercular state certainly disappeared, and the general health might be considered better, but the exfoliation of bones in the extremities continued to go on, and the general health was not so much restored as to lead me to expect any further good; he was therefore allowed to return to his hut. Another case, a creole gentleman, had been dreadfully

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* All boring ulcerations in the soles of the feet, whether from elephantiasis or yaws, are called tubbas.

affected with this loathsome disease for five years; had taken this medicine, but he soon grew tired of its tedious efficacy, and had given it up, either in despair, or in consequence of its exciting nausea. My friend, Mr Kennedy, in compliance with an order from the Army Medical Board, made use of it in two cases of elephantiasis at St Kits', but found his patients unwilling to continue the medicine longer than six weeks. Two grains taken twice a-day kept up incessant vomiting. One of these cases passed large quantities of sand in his stools under its use. Cases not even relieved. It is worthy of notice, that perseverance in the use of this medicine renders the habit more subject to be influenced by its action. On the whole, I consider it an excellent and safe expectorant, useful in cutaneous affections, and as safe and powerful an emetic as ipecacuanha, and one which might be procured at half the expence by cultivation.

" *Edinburgh, September* 1827."

I have only to repeat, what I formerly stated, that, from the liberal supply of Mudar powder sent to me by Dr Adam, I shall be happy to furnish a portion to any gentleman who may wish to make either chemical or clinical experiments with it. Messrs Duncan and Ogilvie, apothecaries in this city, have also been so kind as to take charge of dispensing it to those who may apply to them.

Edinburgh, May 1829.

ART. XII.—*Case of Acute Watery Effusion in the Brain taking place without inflammation.* By WILLIAM SHEARMAN, M.D. London.

SOME time ago I published a small volume,* wherein I declared my intention to be, " to controvert the doctrine of water in the brain being a distinct specific disease, and to oppose the prevalent opinion of the proximate cause of the watery effusion being inflammation." Since that time similar opinions seem to have been entertained, more especially as to the latter part of the quotation, by men of extensive attainments and considerable reputation, particularly by Dr Monro, in his book on the Morbid Anatomy of the Brain; and, therefore, it may be thought that the doctrine I had previously advocated, will, under such auspices, obtain that general acquiescence, which so humble and obscure an individual as myself was inadequate to enforce. Nevertheless, as one particular point referred to in my little treatise seems to have passed unregarded, viz. the frequent occurrence of watery effusion in the brain, as a concomitant or effect of proper idiopathic fever, (in addition to its being an accidental symptom in all other infantile diseases) I deem it not altogether useless to illustrate the truth of this proposition by a case which lately came under my care, from which I deduce, that this effusion was not the consequence of any preceding inflammation in the membranes of the brain, but arose as an accidental occurrence in a weakly and scrofulous constitution, predisposed, therefore, to a great degree of irritability of those membranes.

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* An Essay on the Nature, Causes, and Treatment of Water in the Brain. London, 1825.

Richard Milsom, aged 3 years, of a weakly constitution, and of a scrofulous appearance, was brought, November 6th, to the West London Infirmary with symptoms of hydrocephalus. His head was constantly in rolling motion, accompanied with convulsive twitchings in his limbs. His countenance had an idiotic expression ; and he was incapable of recognizing his mother or surrounding objects. The pupils of the eyes were greatly dilated ; and the child appeared unable to see, a near approach of the hand of a bystander to the eyes not producing any motion of the eyelids. The pupils, however, slightly contracted on the approach of the light of a candle, but not otherwise. The bowels were rather constipated, but there was neither hardness nor tension of the belly ; pulse nearer natural. He had not spoken for many days. The account given by his mother was, that he was attacked a fortnight previously with febrile symptoms, accompanied by purging. These continued for a week, at the end of which time she discovered in the morning, that the child was unconscious of her presence, and incapable of seeing, and exhibited all the other symptoms now present.

Applicetur abdominis lateri dextro Empl. Cantharidis. Sumat statim pulverem aperientem ex Hydrarg. Submur. gr. i. 2 *quaq. horâ.*

November 9.—Blister had drawn and discharged freely. Twelve of the powders had been taken, but at rather longer intervals than prescribed. Bowels well open ; urine copious. The child is now conscious of his mother's presence, and of surrounding objects, and can see perfectly well. The rolling motion of the head and the convulsive twitchings have ceased. He was ordered ten drops of diluted sulphuric acid, and of vinegar of squills, every four hours ; and four grains of rhubarb and of magnesia, with one of calomel, every night.

November 13.—The child is still improving. *Contin. Medicam.*

November 20.—No symptoms remain. The medicines were ordered to be continued for a short time, with the addition to each of the powders at night of three grains of *Ferrum tartarisatum.*

What might have been the view any medical practitioner would have formed in the first days of this affection, and what remedies he would have employed, is uncertain. The disease was completely left to its unrestrained course. What would have been the treatment adopted at the end of the first week, when the appearances of affection of the head were so unequivocal, is again uncertain, for no medical attendance was sought for till a week after that. When I first saw the patient, I considered the case to have been one of proper infantile fever, during the course of which, or at the period of its termination, increased exhalation took place in the cavities of the brain, owing to the irritable state of its membranes and increased circulation in its vessels, so frequent a circumstance in weakly and scrofulous constitutions. I see no evidence of inflammation of the brain or its membranes having taken place during any time of the progress of the disease; no prominent symptoms of the head being particularly affected manifested themselves in the space of the first week; and the sudden accession of those denoting effusion of fluid would seem to be the *effect* of that state of the system, whatever it was, to which the previous febrile symptoms were owing. If it be maintained that these febrile symptoms themselves were nothing more than symptoms of inflammation of the brain, viz. that they constituted hydrocephalus acutus in its first stage, it will be necessary to explain why this inflammatory disease should have terminated in perfect recovery, without the use of any counteracting means, whilst almost all severe cases of a similar kind, when large bleedings and antiphlogistic measures have been employed, terminate fatally. It appears to me, that nature, when left to herself, will frequently bring proper idiopathic fever to a favourable termination, whereas when her efforts are interrupted by active and violent interposition, she is commonly rendered unequal to the task of accomplishing her end. The fever in the case related, not having been interrupted by artificial means, appears to have terminated in seven days by crisis, at which period a great increase of the various secretions usually takes place. In this predisposed subject, increased exhalation into the cavities of the brain also took place. It would have been important to ascertain whether the urinary discharge was here in due quantity, for, as I have elsewhere hinted, the exhalation in the brain and the secretion by the kidneys appear to be vicarious to each other. It is unnecessary, however, to pursue the subject farther. I shall only add in conclusion, that if hydrocephalus acutus, were, as is maintained, an actual inflammatory affection, it ought generally to yield to those active measures which are commonly resorted to in its treatment. The want of success in antiphlogistic remedies to conquer any given disease, when the same disease will yield to other and opposite remedies, is a strong argument against that disease being one of inflammation. My opinion of the non-inflammatory nature of hydrocephalus acutus, is strengthened by the result of other cases of this affection, in what are called its first and second stages, which have come under my management, wherein success has followed the means employed in accordance with the principles I have already advocated.

Northampton Square,
January 17, 1829.

PART II.

CRITICAL ANALYSIS.

Art. I.—*Untersuchungen über den Kreislauf des Bluts und imbesondere über die Bewegung derselben in den Arterien und Capillargefässen, mit erklärenden Hindeutungen auf pathologischen Erscheinungen.* Von Dr Georg Wedemeyer, *Königl. Hannoverschem Leib-und Ober-Staabs-chirurg.* Hannover, 1828.

Researches on the Circulation of the Blood, and particularly on its motion in the arteries and capillary Vessels, with illustrative applications to Pathology. By Dr George Wedemeyer, &c. Hanover, 1828. Pp. 490, 8vo.

Physiologists continue to be much divided in opinion as to the powers which move the blood in the arteries and capillary vessels. One class of them, including besides others of inferior note, *Harvey*, *Haller*, *Spallanzani*, *Legallois*, *Parry*, and *Magendie*, maintain that the sole moving power of the blood is the action of the heart. A second and more numerous class have inferred from their researches that the circulation does not depend on the heart alone, but is also supported by muscular contractions of the arteries. This opinion is upheld by *Pecquet*, *Bartholinus*, *Bohn*, *Senac*, *Verschuir*, *Zimmerman*, *John Hunter*, *Blumenbach*, *Sömmering*, *Langenbeck*, *Tiedemann*, *Béclard*, *Sir E. Home*, *Dr Hastings*, and *Dr W. Philip.* A third class, under which we can arrange only four physiologists of note, *Darwin*, *Bichat*, *Richerand*, and probably *Meckel*, deny that the greater arteries either possess vital contractility or contribute to the propulsion of the blood, but assign to the smaller arteries and capillary vessels a vital contractility through means of which the blood is first attracted and then propelled, and ascribe to the circulation in them a nearly complete independence of the influence of the heart. A fourth and last class, comprehending four late

German experimentalists, *Carus*, *Treviranus*, *Döllinger*, and *Oesterreicher*, believe, as the result of their inquiries, that neither the larger arteries nor the capillary vessels contribute by their contractions to the progress of the blood; but that the blood moves chiefly through means of its vitality or an inherent power of motion, and that its movement as thus effected is materially supported by the action of the heart alone.

Dr Wedemeyer has undertaken in the work now before us the laborious task of inquiring into the foundation of each of these doctrines; which he proceeds to accomplish by an elaborate sketch of the facts ascertained by every physiologist of note, and by personally verifying and varying the leading experiments that have been supposed by their authors to establish the doctrines they have severally advocated. The result of his researches in general terms is, that the heart is the chief or almost sole power which moves the blood in the arteries,—that the greater arteries do not contribute to its motion except by simply restoring to the blood through their elastic contraction the force expended in dilating them,—that the capillaries have as little share as the arteries in impelling the blood by alternate contractions and dilatations,—and that the blood itself does not possess any power of spontaneous motion. We apprehend that the opinions of those in the profession at large who have made physiology a subject of careful study, are gradually approaching towards the doctrines to which Dr Wedemeyer's extensive literary and experimental investigations have led him. To such persons among our readers it must be, as it has been to us, a matter of deep interest to trace the steps by which so impartial and profound an inquirer has arrived at a conviction of the truth.

He discusses his subject in four essays, of which the first treats of the part performed by the greater arteries in the circulation, the second of the movement of the blood in the minute arteries and capillaries, the third of the movement of the blood independently of mechanical actions, and the fourth of the phenomena of capillary attraction in the animal system.

I. *Of the share which the greater arteries have in the circulation.* His inquiries under this head naturally resolve themselves into two questions; 1. Do these arteries possess muscular fibres? and 2. Do they possess irritability or vital contractility, and an influence through its means on the progress of the blood?

Haller, Hunter, Langenbeck, Verschuir, Sömmering, Blumenbach, and many others have conceived that the middle or fibrous coat of the arteries is muscular; but we suspect this opinion meets with few new adherents among the rising generation of physiologists. Dr Wedemeyer, summing up all the objections which have been advanced against it, states, that, whereas the true muscular fibre is reddish, soft, extensile during life, and very brittle after death, the fibrous coat of the arteries is, on the contrary, yellowish, firm, hard, and very elastic even after death;—that its *vasa vasorum* do not distribute themselves as in muscular fibre;—that it does not contain any fibrin;—that it is not excited to contract by galvanism or any other irritant;—and that in its extreme liability to the deposition of osseous matter between itself and the inner serous coat it shows its resemblance to white fibrous tissue in other parts of the body, as well as its distinction from true muscular tissue, between which and serous membranes bony matter is rarely secreted. We confess we have never been able to see how these objections are to be put aside by the arguments of those who maintain that the fibrous coat of the arteries is muscular in its nature.

Under the second question of the present head,—whether the arteries possess vital contractility and a consequent influence on the motion of the blood,—the author enters very fully into the experiments and observations of almost every physiologist who has turned his attention to the inquiry. It would be a fruitless task to attempt to follow him in this part of his work, as it is already condensed almost beyond farther abridgement. A more attainable and useful object will be a statement of the facts which his own experiments have enabled him to discover, to confirm, or to contradict, and of the leading arguments he has drawn up on a comparison of the researches of other authors, with one another and with his own.

No fibre unequivocally muscular is insensible to the stimulus of galvanism. *Treviranus* and *Bichat* have denied that the heart is affected by it, as *Pfaff*, *Humboldt*, *Meckel*, and others had asserted; but the experiments of Dr Wedemeyer agree entirely with those of the earlier experimentalists; nay, the contractions produced were so distinct, that he says it is inconceivable how the experiment on frequent repetition should have appeared to any one to yield a negative result.—On the contrary, his experiments on the greater arteries, carried on for a series of years, and repeatedly performed on dogs, cats, rabbits, guinea-pigs, hedgehogs, birds, frogs, newts, serpents, and fishes, never furnished a single result contrary to the opinion of *Haller*, *Bichat*, *Nysten*, and a host of later physiologists,—that these vessels do not possess irritability or vital contractility. The experiments were made with a battery of fifty pairs of plates on the carotid artery and thoracic and abdominal aorta, sometimes during life, sometimes immediately after death caused in all manner of ways, and the artery was sometimes left in connexion with the heart, sometimes was removed from the body; but the result was always the same; he never could remark any contraction. As little could he succeed in producing any contraction by mechanical stimulants.

The exceptions to this general fact which have occurred to other experimentalists he has found to be more apparent than real. *Osiander* maintains that the arteries of the placenta and umbilical cord contract under galvanism; and *Verschuir* quotes two Dutch authorities for the fact that electricity causes contraction in the aorta. But neither Dr Wedemeyer nor any one else has been able to observe the phenomenon mentioned by Osiander; and the apparent contractions of the aorta under electricity are found when carefully watched, to be nothing else than increased pulsation, arising from the electric fluid acting on the heart and exciting it to increased action.—*Oesterreicher* has observed in fishes alternate contraction and dilatation of the branchial artery. Our author has made the same observation; but says that this may easily be accounted for, because near the origin of the vessel at the heart distinct muscular fibres may be traced, and, on the contrary, no hard fibrous membrane. This structure is particularly distinct in the torpedo. A corresponding structure must be the cause of the spontaneous contractions which *Spallanzani* and *Haller* have observed in the bulb of the aorta of frogs, and in the aorta of salamanders and newts, and likewise of the vascular pulsations observed by many in the lower animals that have no heart.—*Sir Everard Home* found that when the sympathetic nerve and eighth pair were irritated in the neck of a living animal with caustic, the carotid artery pulsated with greater vehemence. But Oesterreicher has explained this fact satisfactorily. If a nerve supplying any vessel be divided, and then stimulated at the end farthest from the brain, the artery does not pulsate with greater force; and hence, if its pulsation is increased when the nerve is not previously divided, this arises from nothing else than the increased action of the heart caused by the pain inflicted on the animal. In like manner, when galvanism has occasionally seemed to cause increased flow of blood from a divided artery, it has acted by occasioning contractions of the voluntary muscles of the part.

In recent times no physiologist has obtained such distinct signs of a contractile power in the arteries as *Dr Hastings.* Under chemical and mechanical irritation he has witnessed increased pulsation, annular and vermicular contraction followed by dilatation, and frequently a permanent contraction. The real cause of increased pulsation has been already explained. As to the other phenomena he witnessed, even granting his observations are free from fallacy, it is plain that the contractions observed do not in the slightest degree represent the changes in the arteries which constitute the pulse, for the former do not commence till some time after the application of the stimulus, and, after they have commenced, their progress is gradual. They appear analogous to the contractions caused by strong stimuli in the parietes of the urethra, and of the excretory ducts of some glands. The contraction observed to take place in the diameter of a divided artery as the blood escapes from it, and which John Hunter asserts may amount to a complete obliteration of the opening, is not a sound argument in favour of vital contractility. Dr Wedemeyer agrees with former critics that Hunter has exaggerated very much the extent of the contraction, and maintains that what really takes place is easily referrible to simple elasticity.

The final result of his researches on the present topic is, that in the natural state of the pulsation of the arteries no such contraction is ever witnessed, as that observed by Hastings on the application of stimuli, or by Hunter and others on the evacuation of the blood,—that Bichat and Parry are correct in stating that a slight augmentation of the diameter of the arteries is caused at each pulsation, but that it is so small as to be with difficulty appreciated,—that all the phenomena of the arterial pulse may be imitated exactly, when life has been for many hours extinct, by impelling water into the vessels by successive jets from a syringe,—that the pulse is owing entirely to the impulse communicated by the heart, in consequence of which the artery is partly dilated, and partly made to shift its place,—that all the phenomena of the arterial circulation may be referred to the elastic contractility of the coats,—and that the greater arteries therefore contribute to move the blood forward only by restoring through their elastic reaction the force expended in dilating them.

In farther justification of these inferences he has entered at some length into the causes of the want of correspondence in frequency, hardness, and fulness, sometimes observed between the pulsations of the heart and the arterial pulse. These phenomena, which have been appealed to by those who believe that the arterial coats possess the power of vital contractility, are here very completely explained. But the author's own observations have not enabled him to add much to the ingenious explanations already furnished by Dr Parry; so that it is unnecessary for us to follow him throughout his exposition. We may merely notice an account he has given of a new mode in which the occasional temporary cessation of the radial pulse may be accounted for. In the body of a mason he found that in the axilla of each side a muscle stretched across from the tendon of the *latissimus dorsi* to the edge of the *pectoralis major*, and in such a way that during life its contraction must have effectually compressed the axillary artery.

II. *On the motion of the blood in the minute arteries and capillary vessels.* In this essay he first gives a full abstract of the experiments and observations of his predecessors on the properties of the blood, the anatomical structure of the minute arteries and capillaries, the various ways in which the latter terminate, and the forces by which the capillary circulation is maintained. He then details his own researches on these points. And he concludes with a relation of the inferences to which his own inquiries and those of other physiologists conjunctly appear to lead. The object of our analysis will be best attained by describing the author's own inquiries, and noticing shortly wherein they confirm, contradict, or add to the information formerly possessed.

1. In his remarks on the composition and qualities of the blood, he coincides with the descriptions of the best recent authors. Nor is there any thing in this portion of his narrative that calls for particular notice here. He appears disposed to adopt the singular views maintained by Gruithuisen,* Dollinger,† and Oesterreicher,‡ relative to the formation of the globules of the blood,—namely, that they are in part formed by globules detaching themselves from the parenchyma of the various organs of the body. These physiologists maintain not only that the globules of the blood may be seen passing from the extreme capillaries into the substance of the tissues which the vessels penetrate,—but likewise, that the globules which have for some time formed a constituent part of the tissues, may in their turn be seen working their way gradually towards some neighbouring capillary, and again joining the stream of the circulation. Hence they believe that the blood is elaborated in the substance of the tissues. Dr Wedemeyer adopts to a certain extent these views. " As the chyle," says he, " contains globules, and is the only channel of nourishment in fully developed animals, it follows that this fluid must perform the most essential part in the formation of the blood. The globules, however, are probably not formed there immediately, but only after they have undergone a metamorphosis in the substance of the tissues." There is a great deal more hypothesis and fancy in all these notions than is exactly consistent with the sober pace at which

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* Salzburger Zeitung. 1820, ii. 280.

† Was ist Absonderung und wie geschieht sie? *Würzburg*, 1819.

‡ Versuch einer Darstellung der Lehre vom Kreislauf. *Nürnberg*, 1826.

modern physiology is at present advancing through the regions of observation and experiment.

Passing from this topic, the author proceeds to state the remarks he has made on the structure and disposition of the minute vessels. He finds, like other physiologists, that the middle or fibrous coat of the arteries becomes less and less strong and distinct as the vessels diminish in size; yet that it may be detected by its whiteness in a transverse section of a vessel whose internal diameter does not exceed a sixth of a line. It disappears in vessels which are too small and too remote to receive the impulse of the heart by pulsations,—a new proof of the little connexion subsisting between the arterial pulse and the action of the middle coat of the arteries.—The inner coat also diminishes in strength and thickness along with the fibrous coat. At length both gradually terminate altogether in membraneless canals formed in the substance of the tissues. " The blood in the finest capillaries," says Dr Wedemeyer, " no longer flows within actual vessels, whose parietes are formed by a membranous substance, distinguished from the adjoining cellular tissue by its texture and compactness, but in simple furrows or canals, whose walls are formed by the surrounding cellular tissue." This opinion, which he shares with several other late microscopical observers, is founded,—on the impossibility of detecting with the microscope any membrane interposed between the parenchyma of the tissues and the blood moving in these extreme capillaries,—on the facility with which single globules of blood are seen, while passing through them, to quit the stream and penetrate among the ultimate globules that constitute the surrounding texture,—on the rapidity with which the blood is observed to work out for itself a new passage or canal in the tissues,—and on the impossibility of the processes of nutrition and absorption being carried on through the coats of vessels.—The smaller arteries receive an increased proportion of nervous twigs as their size diminishes. This is particularly observed in the arteries of the penis and face. The fact now mentioned will alone justify the presumption, that the smaller arteries possess more contractility than their trunks and greater branches.

The sentiments of physiologists differ materially as to the modes in which the minute arteries terminate. This topic the author has investigated with considerable care.

The first mode, concerning which all are agreed, is by their passing immediately into the veins. This intercommunication sometimes takes place with vessels large enough to admit three or more globules of blood abreast; and then the communicating vessels have regular parietes. But by far the greater number of the direct communications between the arteries and veins are effected by means of the extreme capillaries, which have been already described as penetrating the textures in the form of furrows, without any membrane being interposed between the blood and the parenchyma of the tissue. Nowhere, either in the greater or smaller communications between the arteries and veins, can there be seen any openings or pores in the sides or ends of the arteries, by means of which the blood could be extravasated preparatory to its being imbibed by the veins. Neither is there to be seen anywhere a sudden passage of the arterial into the venous streams, —an abrupt boundary between the two divisions of the vascular system. The arterial streamlet usually winds through long routes and many turns before it assumes the direction and nature of a venous streamlet. It is seldom that extreme capillaries pass immediately from the larger arterial twigs, or to the larger venous branches.—The second mode in which the arteries have been supposed to terminate is by communication with lymphatic vessels. The arguments which have been adduced in support of this opinion are, that the lymphatic vessels bear a close resemblance to veins in their valves and tunics,—that various practised anatomists have succeeded in injecting the lymphatics from the arteries,—and that the lymphatics which issue from certain inflamed parts, such as the peritonæum or lungs, or from parts otherwise unnaturally gorged with blood, are often filled with a bloody lymph. Our author does not admit the force of these reasons. The analogy of structure between the lymphatics and veins is but a presumptive argument. The experiment of injecting the lymphatics from arteries has failed in many skilful hands, and has probably succeeded only by rupture of their mutual coats. The presence of red lymph in lymphatics issuing from parts distended with blood may be easily accounted for, without having recourse to a direct communication with arterial capillaries, because in such circumstances the fluid which is in excess will pass through the organic pores of all membranes by capillary attraction. He concludes, therefore, that we are not yet acquainted with any termination of the arterial capillaries in lymphatic vessels. Every canal that is seen by the microscope to be in communication with the arterial capillaries transmits the red globules of the blood.—The third mode in which the arteries have been conceived to terminate is in secreting organs and their excretory vessels. Our author has added nothing to our stock of knowledge on this point. He admits that the passage of the matter of injections from the arteries into the excretory ducts, as well as the frequent discharge of blood by these ducts in certain diseased states of the body, will furnish strong presumption in favour of the alleged communication; at the same time he maintains that the phenomena of sanguinolent secretion may be accounted for from the effects of capillary attraction, or endosmose, without a direct communication between the extreme arteries and extreme secreting vessels.—The fourth mode of termination of the arteries is in vessels or exhaling pores, which transmit only the colourless part of the blood. The existence of this mode of termination, it is well known, has been the subject of much controversy among physiologists. Without the existence of serous vessels, that is of vessels too fine to allow the red globules of the blood to pass through them, it appears impossible to account for the rapid increase of the number of red vessels in the conjunctiva of the eye when it is irritated, or for the immense multiplicity of red vessels which are exhibited after death by a successful injection in a vast number of the organs of the body, which during life exhibit an inconceivably smaller proportion. Dr Wedemeyer is therefore disposed to attach little importance to the objection which Mascagni and others have brought against their existence, namely, that it is impossible to distinguish any such serous vessels by microscopic observation. Some microscopic observers have indeed alleged that they have seen colourless vessels in great numbers. But Haller, Spallanzani, Mascagni, and more lately Oesterreicher, found that these apparently colourless vessels are capillaries which admit only a single row of globules, and appear, by reason of the small quantity of colouring matter, not red, but yellow. Dr Wedemeyer confirms the observations of these physiologists; but at the same time adds, that he thinks he has occasionally succeeded in detecting real serous capillaries.

"The undeniable fact," says he,—"that the streamlets of blood which consist of a single string of globules, are not red or even materially coloured before the microscope, because the globules singly appear yellow, and acquire a red colour only when collected into masses,—will certainly explain many of those experiments, in which it was erroneously thought that serous vessels were seen. But it does not bear us out in the conclusion, that the same explanation is to be given of all the apparently colourless streamlets; more especially as we have hitherto been able to examine the capillary circulation with the microscope only in a very few parts of the body. And, in truth, I have myself often observed in the mesentery of the frog pretty wide capillary vessels, which were to appearance empty, but which were really filled with serum, since, whenever the heart was cut out, and the blood allowed to drain away, these vessels in great measure collapsed, disappeared, and left as evidence of their existence nothing more than streaks of thickened cellular tissue. That they did in these circumstances discharge serum from their cavities, was owing to the elasticity of their parietes, which pressed their fluid contents towards the quarter where least resistance was encountered. One may accomplish the same thing, and empty them of their serum, by stroking them repeatedly with a hair pencil. These serous canals were actually sometimes too narrow to admit or transmit globules. But others were evidently large enough to admit single globules; and one is therefore naturally led to inquire why these vessels, though destitute of Bichat's *specific irritability*, admit only serum. I have no doubt that the following is the cause of this appearance: At their origin in a capillary containing blood, or in some part of their own course, for example at a point where an abrupt turn is made, they are often, as I have witnessed, plugged up or narrowed by stagnating globules, or coagulated blood; so that when so circumstanced they transmit only the more fluid serum, especially when the force of the heart is weakened, and its impulse does not in consequence act everywhere with sufficient power. Hence when the lost power of the heart is compensated by gently stroking the part with a hair-pencil, and the stagnant globules are impelled onwards, the circulation is restored, more globules follow, and the vessel continues for some time at least to convey red blood." P. 284.

With regard to exhalant pores for the discharge of the serous part of the blood, Dr Wedemeyer conceives their existence cannot well be denied. But he objects to the supposition that these pores are visible, *organic*, or, as he explains the term, endowed with a species of contractility, by means of which they retain certain substances, and discharge others. He maintains, that if any such pores existed, they would be perceptible with the aid of the microscope; and he considers that all the phenomena of exhalation may be produced through invisible pores, or the interstices between the ultimate particles which form the organic tissues, and may be explained by the phenomena of capillary attraction as modified by the action of the nervous system on the textures. In these views he approaches closely to the theory which M. Dutrochet has founded on his discoveries on Endosmose and Exosmose, as related in our last Number

2. Having thus endeavoured to determine the anatomical distribution and structure of the capillaries, Dr Wedemeyer next inquires what are the forces by which the blood is moved in them. Four distinct forces have been admitted by various physiologists, the impelling and sucking power of the heart,—the contractility of the minute arteries and capillaries,—an innate power of motion in the blood,—and capillary attraction. The two first of these he considers in the present essay; the remaining supposed forces he makes the subjects of two separate inquiries.

a. The agency of the heart in the capillary circulation has been questioned by some physiologists, and particularly in recent times by Bichat, who maintains that its impulsive power is almost entirely lost when the blood reaches the capillaries. Dr Wedemeyer denies this assertion, and with great justice maintains that the transmission of the heart's impulse, even to the extreme capillaries, may be inferred from the slight force required to impel water, a solution of indigo, or fresh drawn blood through them with the syringe even from a large artery, —a force certainly far inferior to that with which the blood in the same artery flows through it under the action of the heart during life. This statement, we have no doubt, would have appeared to our author still more forcible, had he been aware of the fact discovered since the publication of his work by M. Poiseuille of Paris,—that each molecule of blood retains the force it received from the heart, even after it has passed through a long course, and through many subdivisions of the arterial system. * That the impulse of the heart extends even to the capillaries, is further shown by the effects of depletion, or of fainting on sanguinolent secretions, on redundant secretions, and on hemorrhage. Our author farther coincides with Haller and Spallanzani in the observation, that the saltatory movement which the blood possesses in the greater arteries may, under certain circumstances, be seen in the minutest capillaries, nay, occasionally even in the veins. It is well known that the saltatory movement of the blood in the greater arteries is most distinctly seen when its flow is feeble, for example, after great hemorrhage. If the capillaries be examined with the microscope under the same circumstances, Dr Wedemeyer maintains the blood will often be seen moving *per saltum* even there. He " has often observed in frogs and tadpoles, and once in the bat, that when the circulation was becoming feeble, the blood in the finest capillaries advanced by jerks corresponding with the contractions of the heart; and he even remarked the same appearance in the fine veins several times in the toad and tadpole, and once in the frog."—P. 296. Lastly, when the heart is cut out or tied, the capillary circulation, whatever may have been said to the contrary by some physiologists, ceases instantaneously. There may frequently be remarked, indeed, for some time afterwards, a feeble movement of the blood, either progressive or more frequently oscillatory;—but the nature of these movements will be explained hereafter, and will be found to arise from mechanical causes, and to be by no means of a kind which could contribute to the progress of the circulating fluid.

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* See the Original Communications of the present Number, p. 28.

Although, then, it cannot be denied that in some of the lower animals the capillary circulation is carried on without a heart, it appears as little doubtful, that where a heart does exist its contractions constitute the principal force by which the capillary circulation is maintained.

Besides acting on the blood in the capillaries by its impelling power, the heart Dr Wedemeyer conceives to possess also the power of promoting the capillary circulation, though certainly in a much lower degree, by the suction power of its auricular cavities on the blood in the veins. He expresses his surprise that Dr Bostock should have doubted, and Bichat denied, the existence of this suction power; maintains that he has witnessed it often acting on the great veins in living animals; and, admitting its feebleness, insists, nevertheless, that it ought to be taken into account among the powers which move the blood.

> "In a horse affected with the glanders, the jugular vein was laid bare and tied; and below the ligature there was introduced towards the heart a catheter, which was soldered to a bent glass tube, two feet and a half long. The animal being in the standing posture, the longer descending limb of the tube was immersed in a glass of coloured water. At first the inspirations were synchroneus with the pulsations of the heart, and thirty per minute; and we observed that the coloured fluid rose synchronously and suddenly two inches and more in the tube, and then sank to its original level. But gradually the animal became restless, and the respiration twice as frequent as the pulse; and now we remarked distinctly, and for a long time, that the coloured fluid rose not at each inspiration, but at each pulsation of the heart, and therefore synchronously with the diastole of the auricles. Occasionally the rise did not occur for a single pulsation at a time, probably because some momentary pressure or other on the jugular vein prevented the suction power of the heart from acting. But the rise was never more frequent than the pulse, and was always simultaneous with a contraction of the heart. If by an unexpected movement of the horse the end of the tube was raised out of the water, the air was drawn into the tube; and this air was again expelled when the tube was replaced in the water." P. 310.

This is a satisfactory experiment, which, besides establishing the author's principal object, also serves to show how insignificant in the natural state of the breathing is the suction power, which is supposed by Dr Barry to be exerted upon the venous blood by inspiration. Dr Wedemeyer makes a digression at the present place to Dr Barry's theory, and assails it with great vehemence and success. He objects to that author's notions, 1. that the tendency to a vacuum in the chest during inspiration must be completely overcome by the entrance of the air, an elastic, mobile fluid, before any material suction power can be exerted on a heavy inelastic liquid, such as the blood; 2. that the afflux of blood in a tube towards the jugular vein of the horse was observed by Dr Barry to correspond with inspiration only when the animal was lying, and, consequently, breathing with unnatural force with one side only of the chest; and that in the erect posture no such correspondence is to be observed, unless the animal is excited to violent respiration; 3. that the tendency to a vacuum in the chest cannot account for the movement of the blood in the pulmonary veins, which are subjected outwardly to the same power which is supposed to act on the blood within them; 4. that the venous circulation may be kept up in the Mammalia by artificial breathing for twenty-five minutes or longer after decapitation, although in such circumstances the chest internally is constantly subjected to pressure; and that in frogs and other cold-blooded animals the venous circulation will continue for hours after the breathing has been annihilated by laying open the chest; 5. that the venous circulation goes on in the fœtus, and in many of the lower animals without any respiratory movements whatever. Some other objections are also stated, but the foregoing are the most material; and along with what has been already ably advanced on the subject by Dr Arnott, will, we apprehend, render the supposed discoveries of Dr Barry exceedingly doubtful.

b. We have next to follow our author in his examination of the question, whether the motion of the blood in the capillaries, derived, as we have seen, in great measure from the heart, and not promoted by any contractile power of the larger arteries, is owing in part to a contractile power in the smaller arteries and capillaries themselves?

His experiments are quite decisive of the fact that the smaller arteries possess contractility. They were first directed to the question disputed between Bichat and Magendie as to the prevention of the passage of various fluids in the living body, from the arteries into the veins,—Bichat having maintained that bland fluids cannot be forced through on account of the contraction of the capillaries; while Magendie asserts that even irritating fluids may be transmitted without difficulty. According to our author, the truth lies in the mean between these two statements: His experiments fully prove that water may be transmitted, while the capillaries contract upon and impede, or even prevent the passage of active stimulants. He first tried the effect of tepid water. The brachial artery of a horse being exposed and divided, and the humeral veins also laid bare and opened, several syringe-fuls of tepid water were injected into the lower end of the artery. Slight pressure was found sufficient to force the fluid through the capillaries; at each injection the water issued in a full stream from the apertures in the vein, and the flow ceased when the injection was ended. Instead of water pure cold brandy was then tried, and four syringe-fuls were injected; a far greater pressure was required to impel this fluid through the vessels, so that its smell and taste should be perceptible in what issued from the veins; and even when it did issue it merely trickled in a feeble stream. At the same time the arteries and veins did not undergo the slightest diminution in their diameter. In another horse this experiment was repeated with vinegar, six syringe-fuls being injected in rapid succession. At first the vinegar passed through as easily as water; afterwards, however, it passed with much greater difficulty, and only in a small stream; ere long the force required was very great; and at length complete stoppage was produced, and no fluid issued from the veins. These experiments were several times repeated and always with the same or analogous results. Hence it is evident that the capillaries possess the power of contracting with great force, and to a very great degree, when they are strongly stimulated. This power is vital. It cannot be objected that the fluids employed in the above experiments might have caused contraction by their chemical effects; for if vinegar be injected into an artery in a dead animal, it passes through to the veins as easily as water.

Dr Wedemeyer's attention was next turned to the examination of the capillaries by means of the microscope. These experiments have been repeated under nearly similar circumstances by so many late physiologists, that we should expect to see at length harmonious results obtained; and accordingly our author's observations coincide with those of almost every good observer in recent times. When the mesentery or web of the frog was examined with the microscope during the natural state of the circulation, no change whatever could be observed in the diameter of the smaller arteries or capillary vessels. But when various stimuli were applied to them their diameter was materially altered. Napththa, laudanum, tartaric acid, very dilute muriatic acid, and even alcohol when applied to the small arteries or capillaries of the mesentery produced no very obvious or constant effect. Twice only did alcohol cause a stagnation of the blood, without any contraction of the vessels. But muriate of soda caused in the minute arteries in the course of three or four minutes, a contraction which amounted to a fifth of their calibre; and this was followed by dilatation and gradual retardation and stoppage of the blood. In the capillaries, and also in the minute veins, it caused dilatation without previous contraction. Ammonia caused direct dilatation even in the small arteries. Mechanical irritation, by pricking and pinching, occasionally, but by no means uniformly, caused trivial contraction. The effect of galvanism was much more striking.

" When the lesser arteries were touched with either the negative or positive wire of a battery of from 14 to 24 plates excited by a solution of salt, in a space of time varying from ten to thirty seconds, nay, sometimes immediately after the completion of the galvanic circle, a distinct contraction took place, which amounted to one-fourth, one-half, or even three-fourths of their calibre. The blood flowed more rapidly through the contracted parts. Nearer the heart the arteries were dilated and the flow of blood was retarded. This contraction sometimes lasted a considerable time, nay, occasionally for several hours till the end of the experiment; in other instances the contraction ceased in ten minutes, and the arteries resumed their former diameter. A second application of galvanism to such arteries failed in general to cause any material contraction.—When this experiment was repeated on the veins a slow and trivial contraction appeared to me to be produced in one instance; but in every other the application of the wire was rapidly succeeded by gradual dilatation and retardation or stoppage of the blood.—On the capillaries the effect of galvanism was more striking: Constantly there was produced more or less quickly, and for the most part within a minute, a remarkable retardation of the current of blood, amounting in no long time to complete stoppage and coagulation. The capillaries appeared enlarged, and if previously transparent and colourless, they now became bright red and as it were inflamed. * * * *

" This striking appearance of the coagulation of the blood and stoppage of the circulation in the capillaries on the application of galvanism, is worthy of notice on several grounds. It cannot be the effect of the chemical action of one or other galvanic pole on the blood, as it is produced indifferently by either; neither is it the effect of contraction of the capillaries, for they do not possess the power of contraction in their parietes, at least I have never been able to develope it by the strongest chemical or mechanical stimulants, or by galvanism. I conceive that it arises from the influence of galvanism on the nerves, and through them on the blood. When removed from the influence of the nerves, as by its being withdrawn from the body, or by the destruction of the nervous energy of the part through violent inflammation or other excessive irritation, it coagulates. For its fluidity, therefore, there is required a certain natural state of nervous impression; when this is disturbed the blood loses its fluidity. Galvanism then acts by disturbing, enfeebling, paralyzing the function of the nerves which supply the capillaries, a conjecture which derives additional probability from the fact that the small vessels, in which alone it causes coagulation of the blood, are much more liberally supplied with nerves than the larger arteries.—The appearances now mentioned as resulting from the application of galvanism bear a singular resemblance to the forerunners of inflammation, coagulation of blood in the capillaries and stoppage of the circulation there being one of the most essential and characteristic conditions of inflammation and gangrene." P. 243.

The contractility proved by the foregoing experiments to exist in the minute arteries, and which is precisely the same with that observed by many other physiologists from Haller downwards, our author considers to be analogous with the contractility which has been observed in the urethra, in the small bronchial tubes, in the corion of the skin, &c. It is called forth only by unusual stimulation, and is not perceptible in the natural state of the circulation. It does not contribute to move the blood in the capillaries; but on the contrary, (as *Haller* himself has expressly stated, notwithstanding the opinions of an opposite tendency which some modern writers have ascribed to him) it rather tends, when it is exerted, to obstruct the circulation. Dr Wedemeyer then denies that the circulation of the blood in the capillaries is in any degree aided by contractions of these vessels and of the smaller arteries; and in farther support of this opinion, maintains that the movement of the blood in the capillaries ceases the moment a ligature is tied on the aorta near the heart, and that those who have arrived at an opposite conclusion from their microscopic researches have allowed themselves to be deceived by causes whose operation will presently be alluded to.

III. *Of the movement of the blood independently of mechanical actions.* Hitherto we have seen only one moving power acknowledged by Dr Wedemeyer, namely, that which depends on the contractions of the heart. In his third inquiry he proceeds to consider the power of spontaneous or innate motion, which is supposed by some late physiologists to reside in the blood itself. This doctrine has been advocated by Carus, Treviranus, Döllinger, and especially by Oesterreicher, who even goes so far as to insist that "the chief moving power of the blood resides in the blood itself, and the heart is to be considered as only the chief of the accessory moving powers." The notion of a self-moving power residing in the blood is founded on the alleged continuance of the capillary circulation after the heart has been removed or the aorta tied,—on the effect of laceration of the brain, or of narcotics in checking the circulation,—on the oscillation of the blood in the capillaries when the general circulation is in any manner weakened,—and on the appearance often witnessed of single globules in the capillaries separating from the main stream and thrusting themselves among the globules that form the substance of the tissues, or, on the other hand, quitting the substance of the tissues and rejoining the stream of the circulation. Our space will not permit us to follow Dr Wedemeyer where he examines the solidity of the basis on which the doctrine of a self-moving power in the blood is thus founded. He appears to us completely successful in proving, that in all its parts the foundation is flimsy and false. We shall merely mention what he has stated regarding the supposed movement of the blood in the capillaries after the cessation of the heart's action. The motion observed has been sometimes progressive, but much more generally oscillating or fluctuating. Both he thinks may be attributed to mere mechanical causes, such as the tendency of the vessels in consequence of the elastic contraction of their coats to empty themselves towards any point in the circulating system where the blood can find an exit, the tendency of the blood to gravitate towards the most depending parts, local impulses communicated by contraction of muscles, similar impulses communicated by slight external force, such as pressure, friction, and the like, and the recoil or reflux caused by a wave or impulse meeting with an obstacle. These and similar causes he conceives will readily account for almost all movements that have been observed, especially when it is considered that the apparently extensive and rapid movements seen through the microscope are in reality very trifling.

If the blood then does not possess any power of spontaneous motion, and the arteries great and small, as well as the ultimate capillary vessels, do not contribute to the movement of the blood by any action of their coats, how are we to account for the numerous phenomena of the circulation, which cannot be ascribed to the impulse of the heart's contractions alone? In some of the lower animals, for example in the Echinodermata, circulation is carried on without a heart at all; in some malconformed fœtuses, too, the heart is wanting, yet the blood circulates, and without pulsation of the vessels; under the influence of passions of the mind the face becomes flushed, and the *corpora cavernosa penis* become distended with blood, yet without such signs of general excitement or turgescence as indicate increased action of the heart; after the constriction of the capillaries is over, which appears to be the first effect of local irritation, swelling and turgescence succeed, with stoppage of the circulation through the affected part, and increased pulsation in the arteries leading to it; after death the arteries in general become emptied of blood, yet without undergoing obliteration of their cavity, or any thing farther than mere flattening. In order to explain these and such other facts, of which a very full enumeration has been given by our author, he maintains that we must assume the existence of a vital attractive force in the tissues,—a power by which the blood is drawn towards them, and which is regulated as to its energy by the nervous system. That the nervous system does perform some important part in the functions of the smaller arteries is evident from the liberal distribution of nerves to their coats, and from the local effects on the capillary circulation of sudden impressions which can operate only through the medium of the nerves.

The notion that the function of the nerves of these vessels is to impart to the organs through which they pass an attractive force, by means of which the blood is drawn to them, though plausible, is of course to be considered in the light of a hypothesis only; and as such must be carefully separated from the strict experimental inferences which form the chief part of Dr Wedemeyer's inquiries.

IV. The present subject leads the author by a natural gradation to his *Fourth* Division, which treats of *the Phenomena of Capillary attraction in the animal body, and its influence on the movement of the fluids in the capillary system.* Under this head he commences with a succinct view of the phenomena of capillary attraction generally, and more particularly of those which are exhibited by animal membranes in regard to various fluids, both gaseous and liquid. Here the experiments of Magendie on the permeability of the living tissues, and those of Fodéra on the effect of galvanism in facilitating the passage of fluids through them, receive particular mention; the observations of Sömmering, on what may be called the elective transmission of fluids through membranes, are also cursorily noticed; and then the author naturally finds himself on the same train of investigation with M. Dutrochet, whose interesting researches on the reciprocal transmission of fluids through organic membranes and inorganic plates were fully analyzed in the last number of this Journal. Dr Wedemeyer, in conjunction with his friend Mr Brande of Berlin, and apparently without any previous acquaintance with the discoveries of Dutrochet, has observed many of the striking facts witnessed by that physiologist. The following experiments are worthy of being quoted as confirming and illustrating the general doctrines established by Dutrochet.

"If a wide glass tube filled with water, and closed at its lower end with some animal membrane, be plunged into a vessel containing a mineral acid, the water will penetrate the membrane by virtue of a superior capillary attraction for it, and at its outer surface unites continually with the acid by chemical affinity; so that gradually the whole water passes out of the tube and mixes with the acid, while the tube is thus emptied. If, on the contrary, the acid be poured into the tube, and the water into the outer vessel, the water penetrates through the membrane and unites with the acid in the tube, so that the latter gradually rises, and at length flows out at the top of the tube. If instead of an animal membrane a vegetable one be substituted, no such phenomena occur.

" Mr Brande made also the following experiment, of the accuracy of which I have since satisfied myself. If the end of a glass tube five lines in diameter be hermetically closed by the swimming-bladder of a fish, placed in a vessel of water, and filled to the level of an inch above the surrounding water with blood deprived of its fibrin, the bladder, owing to its stronger capillary attraction for the water, is penetrated by that fluid. The water, in consequence of chemical affinity, unites with the blood as fast as it passes through the bladder ; so that at length the blood now converted into a bloody water will rise several inches in two days, or a little more, and flow out at its upper opening. A few hours after this process has commenced, and when the blood has undergone solution in the water which has passed through, and appears a dark but translucent liquid, a slight capillary attraction begins to be manifested between the bladder and this solution of the blood, a stream is established in an opposite direction to the former, though much more feeble, so that at last the water in the outer vessel is reddened slightly by the transmitted colouring matter of the blood."

" If, on the other hand, the tube filled with blood is placed in a vessel containing a solution of salt, no passage of the solution will take place towards the blood through the swimming bladder, there will be no solution of the colouring particles of the blood, no change of its colour, no rise in the tube, and the solution will undergo only a very faint alteration of colour, after a long interval."

" These experiments show that an animal membrane exerts its capillary attraction variously on various liquids, that it attracts water more strongly than blood, and that blood strongly attracts water, since so distinct a rise and flowing over of the fluid in the tube can be ascribed only to such an attraction, and by no means to the capillary attraction of a tube so large as five lines in diameter. Is there not a striking resemblance between the phenomena now described, and the phenomena of absorption in the living animal body ? May it not be by powers similar to this that the motion of the blood and other fluids is effected in animals which have no heart ?"—P. 433.

Although Dr Wedemeyer has not the merit which is peculiarly due to M. Dutrochet, of having ascertained the general laws of the reciprocal transmission here indicated, or of tracing it throughout its minute phenomena, yet we apprehend he must share with the French physiologist the merit of directing the attention of the scientific to the important part which in all probability it performs in many of the animal functions. After showing how many of the changes which take place in the body soon after death may be satisfactorily referred to the agency of an elective capillary attraction, he proceeds to observe, that the question then comes to be, whether the laws of capillary attraction continue active also in the living body, or are modified, if not even suspended, by the vital powers, more particularly by the influence of the nervous energy? In reply he maintains, that many of the phenomena of absorption are quite inexplicable, unless we admit the existence of capillary attraction; that this power, for example, will account for the entrance of various fluids into the lymphatics and lacteals, whose extremities have not any visible pores or other openings, and likewise for the motion of the lymph and chyle in vessels which do not possess any power of impelling their contents by alternate contraction and dilatation, and in which an impulsive force is not constituted as in the veins by a *vis a tergo* from the arteries. He admits at the same time that the vital powers must materially modify the phenomena of capillary transmission, and very neatly sums up the various modes in which such modification may be accomplished. He further maintains, that not a few of the phenomena of exhalation, secretion, and nutrition, are also intimately connected with the operations of capillary attraction modified by the vital powers. But it is impossible for us to follow him through these difficult and obscure topics, without details inconsistent with the objects of the present analysis. It must, we conceive, appear evident to every one who reflects on the subject, that the laws of capillary attraction through the animal tissues, more especially those unfolded by the researches of Dutrochet, are capable of extensive application to the phenomena of all the above-mentioned functions. But for the present it is not easy to trace their operation without too frequent a reference to mere hypothesis and conjecture; and this defect may be discovered without much difficulty in the concluding part of Dr Wedemeyer's work. As to the effect of capillary attraction in promoting the movement of the blood in the capillary vessels, we shall merely observe, that he is at some pains to show that those who deny its power have not grounded their denial on any sound argument; but, nevertheless, he ultimately arrives at nearly the same conclusion, namely, that capillary attraction of the minute vessels cannot be considered as a moving power of any material consequence.

ART. II.—*Traité sur l'Alienation Mentale, et sur les Hospices des Alienés.* Par JOSEPH GUISLAIN, Medecin à Gand. *Ouvrage couronné et publié par la Commission de Surveillance Médicale dans la Province de Norde-Hollande,* *Séant à Amsterdam.* Tome I. pp. 404, et. II. pp. 359, 8vo. A Amsterdam, chez J. Van der Hey et Fils et Les Heritiers, H. Gartman, 1826. *Treatise on Mental Derangement, and on Hospitals for the Deranged.* By JOSEPH GUISLAIN, Physician at Ghent. [Continued from Vol. xxxi. p. 369.]

THE treatment of insanity may be said to consist of three general heads,—the employment of moral means, the employment of material or medical remedies, and the use of means, the operation of which is either not well known, or is referable to neither of these heads exclusively. In our last we took a hasty view of the manner in which M. Guislain discusses the management of the moral treatment of insanity. It is now our duty to consider with equal brevity the manner in which he treats of the medical and empirical management of the disease.

Under the former head he arranges, 1*st*, means intended to operate on the cerebral nervous system; 2*d*, those operating on the intestinal tube; 3*d*, those operating upon the skin; 4*th*, depletion from the vascular system; and 5*th*, medicines of the stimulant and tonic class. The latter comprehends specifics, dietetic measures, and the influence of climate as a means of curing insanity.

Though the theoretical principles with which M. Guislain introduces this subject are not entirely unobjectionable in this respect, that he founds his indication upon the disturbance in the *nerves proper to the brain*, the existence of which is questionable, and speaks of the brain being in a state of action, which is also liable to doubt, yet the precepts which he delivers merit some attention, in so far as they contain the result of the research and experience of practical observers. Without attempting at present to inquire into the truth of the opinion which ascribes nerves and action to the brain, it may be stated as matter of fact, that some classes of insane patients present symptoms of peculiar restlessness and irritability, which it is perhaps not very erroneous to ascribe to undue excitement of the brain. Thus vision and hearing are inordinately excited by very trifling objects; the imagination is in incessant action; sleep appears to forsake them, or if for a short time their eyelids are closed, they are visited by dreams so frightful that many of them tremble for the hour of repose. These states it has been found expedient to alleviate, if not to remove, by the administration of medicines from the class of narcotics.

The exhibition of opium, the most powerful and efficient of these, requires great discrimination. M. Guislain recommends to consider previously the presence or absence of vascular excitement,—the state of the sanguiferous system as to plethora or vacuity,—the condition of the secretions and excretions,—and the origin of the maniacal attack; for though these circumstances do not constitute absolute contraindications, the practitioner must exhibit the drug under such restrictions and with such qualifications as to obtain its remedial without its deleterious effects. To obviate constipation, it is requisite to administer purgatives by the mouth or by enema; and in symptoms of plethora, blood-letting, general or local, must be premised.

He follows Bernard Heute and Cullen in allowing opium to be indicated, particularly in mental derangement with sleeplessness; Van Swieten in recommending it in that which supervenes on the suppression of the lochial discharge; Esquirol in mania accompanied with great nervous tension; Schneider in monomania distinguished by melancholy, tears, and sighs; and Sutton, Trotter, Armstrong, and other English physicians, in maintaining its exclusive indication in the insanity of drunkards or *delirium tremens.*

That acute inflammation is rare in this last form of insanity, he remarks, is proved by the success of the stimulating method of treatment, and the absence of traces of the inflammatory process in the bodies of those cut off by the disease. Though cases occur with red injected countenance, hard full pulse, and requiring sometimes general blood-letting, more frequently leeches applied to the head, purgatives and blisters, these symptoms indicate either a state of passive congestion of the vessels, or inflammation consecutive to a previous lesion of the nervous system. In these circumstances, and when the subject is feeble, pale, exhausted, and with weak small pulse, the action of opium is known experimentally to be highly efficacious. Its operation, which Kriebel of Berlin imagines to consist simply in inducing sleep, it is perhaps impossible satisfactorily to explain. Though exhibited in large doses, it is better to repeat them at short intervals, than to give all at once a large quantity. Thus, though Binns gave 2 scruples of solid opium in one dose, and 20 grains four hours after with success, and Brandreth caused a furious maniac to take at once 400 drops of laudanum with the effect of rendering him calm and reasonable, these cases show rather the great quantity which is requisite to produce a proper impression on the system and on the disease, than the uniform expediency of the practice. M. Kriebel recommends the exhibition of a single grain every hour, till perfect sleep is induced, and limits the maximum dose to 26 grains in twelve hours. Van Swieten did not exceed 15 grains. M. Guislain advises the practitioner to begin with 2 grains, and increase the dose to 10, 15, or 20, according to circumstances.

When quantities so large are requisite to be given, the choice of the preparation is not a matter of indifference. M. Guislain recommends the syrup of morphine, according to the formula of Magendie. In all instances it is important to exhibit the sedative without the narcotic part of the drug, which certainly is most remarkable for augmenting headach and thirst, and checking all the secretions. It is singular that the successful issue of the case recorded by Van Swieten of the maniacal girl who swallowed by mistake a scruple of opium in vinegar, and which he quotes from that author, did not suggest to him the advantage of the acetate of morphia.

In some respects henbane, which was recommended by Willis as a good substitute for opium, may be used with greater benefit than that drug. It diminishes sensibility without previous excitement; it does not suspend the secretions; it does not cause constipation; but, according to M. Guislain, it is followed by greater debility than what results from the use of opium.

Though the mode in which camphor operates is quite unknown, its efficacy in the treatment of some forms of this disease is undoubted. It has been administered with favourable results by Kinneir, Cullen, Dobson, Auenbrugger, Hufeland, Perfect, Viborg, Schonheyde and Schneider; and if it has been attended with unfavourable effects in the hands of Ferriar, Cox, Muller, and M. Guislain, this is only what happens daily in regard to other medicinal agents. The great objection to all the trials hitherto made with this substance, is that other means were employed at the same time or previously, and it is impossible to distinguish between the effects produced by the camphor and those resulting from the other means, and very difficult to say how much of the recovery was the result of the efforts of nature. On this topic we refer to some experiments reported in our last number.

Of musk little is said, unless that, as a powerful excitant, it is contraindicated whenever there is reason to suspect vascular excitement. M. Guislain thinks it is most likely to be beneficial in attacks of derangement from repelled eruptions, and in those accompanied with convulsions. From the testimony of Locher, who, after giving it in six cases without success, calmed the violence of a seventh by doses of from 15 to 20 grains daily, there is little encouragement to rely upon its powers.

Foxglove, originally tried and recommended in the treatment of insanity by Ferriar, is eulogised by Cox and Frank in cases unattended with organic change, by Fanzago where there is excessive sensibility, was found beneficial by Willis, and has stood some good trials of its efficiency in the hands of Müller, who found it produce lucid intervals, and infers that it may be useful in furious mania. In one trial made by the author the drug produced no change either on the disease or on the rapidity of the pulse; and from another in which insanity supervened on parturition, three half-grain doses were followed by all the symptoms of poisoning,—nausea, vomiting, giddiness, unquenchable thirst and dryness of the throat, sopor, and eventually a state resembling intoxication, after thirty-six hours of which the patient gradually became more sensible, and finally recovered reason permanently.

Thorn-apple, *(Datura stramonium)*, from the experiments of Storck, Smaltz, Bergius, Grandidier, Schneider, and Reil, he infers, is a remedy, the administration of which requires much caution. Though the cases reported by these authors recovered, the drug produces in small doses giddiness, derangement of the sensations, palsy, sleeplessness, and intellectual disturbance, and in strong doses delirium, lethargy, and death. The experiments of Greding, which are not mentioned by Guislain, show that little reliance can be placed on it.

The efficacy of deadly nightshade has been maintained by Munch, by Müller of Würzeburg, and by Frank, the last of whom thinks it particularly indicated in derangement combined with spectral raving and epileptic attacks. In this, however, M. Guislain thinks we should repose little confidence, since insanity with epilepsy is almost invariably an incurable disease. In this unhappy complication he recommends with great judgment good air, constant occupation, labour, frequent walking, with sound food of easy digestion, vigilance on the part of the attendants, and the maintenance of the forces in just equilibrium.

To cherry-laurel water much efficacy has been ascribed in several varieties of monomania, and especially in hypochondriasis. In its property of diminishing the strength of the beats of the heart, it resembles foxglove. Of all the medicinal agents now enumerated it is important to remember, that it is a common property to cause delirium or temporary derangement, and therefore their administration for the removal of this disorder requires much prudence.

On the use of electricity and galvanism we find little accurate information. They have been chiefly employed in mania combined with palsy; and as in this complication little can be expected from any remedial management, so in slighter forms the trials that have been made by Perfect, Hufeland, and Esquirol, are not sufficiently numerous or varied to enable us to appreciate the real merits of the means employed. As to animal magnetism, which also claims its supporters, it is a chimera; and when employed it is much more likely to produce than to remove derangement.

Rotation, which was originally proposed by Darwin with the view of operating on the nervous system, though ludicrously stigmatized by Haslam as "spinning a madman on a pivot," is probably the measure which has received more general trials than any other. Cox, and afterwards Hallaran, laboured to put this method in practice by suspended chairs of various construction; and Von Hirsch, in imitation of the latter, employed a sort of cot or hammock in which the patient was to be subjected to this rotatory motion. Whatever be the construction of the mechanical means, the object is uniformly the same;—to induce, according to M. Guislain, great prostration in the intellectual functions, or rather,—to speak more justly to the fact, to produce upon the capillary circulation of the brain that peculiar impression which denotes diminished influx of blood into the cerebral arteries. The hypothesis of Darwin on the mode in which rotation operates, may be found in the work of that ingenious speculatist. To M. Guislain we are indebted for a distinct account of the actual effects of the method. When a man in good health is subjected to the rotatory movement, the first phenomenon of which he becomes aware, is a disagreeable sensation in the forehead, and at the epigastric region. Speech is embarrassed; respiration is performed with pain; and an indescribable sensation is felt in all the members. Very soon squeamishness comes on, and is succeeded by vomiting; giddiness takes place, and if rotation is prolonged, all the voluntary muscles are struck by instantaneous palsy; the person loses equilibrium, the head drops on the chest, the hands fall on the fore-arm, the pelvis slides forward, and all physical and mental sensation is lost. The pulse during rotation is almost always slower than usual. In some persons the surface becomes bluish; in others it is sallow and faint. Great variation is observed between the capability possessed by different persons of enduring the rotatory motion. Horn of Berlin, who has made pretty extensive trials, pretends that the patient may bear it for at least two or three minutes. Guislain, on the contrary, found that some patients can scarcely bear two or three revolutions of the machine without becoming giddy and vomiting; that young maniacs, with animated eyes and impetuous agile motions, bear it with difficulty for three or four minutes; and that some are absolutely insensible to its effects. In general it appears that when a patient endures rotation for five, eight, or fifteen minutes without becoming giddy or sick, he is quite insensible to its operation, and the disease undergoes no change from its employment.

One of the most important circumstances resulting from the trials made by M. Guislain and others is, that rotation appears to be particularly indicated and particularly useful in those instances of derangement in which there is weight at the epigastric region, want of appetite, loathing or refusal of food, constipation and other symptoms of deranged digestion. Under such circumstances its beneficial operation is more certainly secured, if it produces vomiting, which it may do where emetics fail, and, as occasionally happens, several loose stools. Its most general effect appears to have been to produce sleep, diminution of the unnatural muscular strength, and inclination to take food. Of eight cases reported by Cox, in three the rotatory motion produced advantageous results as means of repression; in three it effected cures; in one only there was an improvement in the moral condition of the patient; and in one only it was entirely unsuccessful. Of thirteen cases detailed by M. Guislain, in three he obtained complete cures; in two he suspended the maniacal accessions; in three rotation was highly useful as means of repression; in four it was unsuccessful; and in one only it was positively injurious. Upon the whole, rotation is useful as a means of cure in insanity, where there is neither organic disease, great insensibility, apoplectic diathesis, nor delirium with plethora. It operates partly by the vascular debility which it induces in all instances, partly by the tendency which it shows to induce squeamishness and vomiting; and it is chiefly useful previous to maniacal accessions, and in periodical mania.

By means which operate directly on the intestinal tube, M. Guislain understands those which either excite the contractions of the stomach so much as to invert its natural motion and induce nausea and vomiting, or increase the number and quantity of the alvine evacuations,—in plain terms, emetics and purgatives. Though the employment of these medicines in the cure of mental disorders is of very high antiquity and very generally practised, no accurate observations have hitherto been made on their exact effects in obtaining the object desired, or the degree of their applicability to different forms of insanity.

The administration of the former of these agents M. Guislain restricts to the following indications.

1*st*, Emetics are indicated as derivatives to effect, by means of the organic movements of the stomach, a favourable diversion of the ideas. This is accomplished chiefly through the medium of the pneumogastric nerve, by acting on the ramified extremities of which M. Guislain conceives the physician may induce a favourable change in the brain. 2*d*, Emetics are particularly useful in the commencement of mania and in that of different species of monomania. This is established by the practice of Perfect and Esquirol, and by various experiments made by Dunne, Daudebertieres, Hufeland, Billerey, and Muller of Würzeburg. 3*d*, In languor of the system of the portal vein and impaired energy of the biliary secretion, emetics, by reanimating the organs of this apparatus, may produce a favourable change in mental derangement. This is admitted by all observers. *4th*, Emetics are not less useful when derangement is connected with suppression of the menstrual or hemorrhoidal discharge. The re-appearance of the latter frequently follows the administration of an emetic. *5th*, Emetics are useful in the different species of monomania by the sweatings which they favour. The influence on the skin is admitted by all practitioners.

Though the author establishes these as the chief indications for the employment of emetics in the cure of insanity, he cautions his reader against their indiscriminate use. Whenever there is much vascular congestion of the cerebral or meningeal vessels, indeed, experience shows that emetics are not entirely safe. Any inflammatory point in these parts renders the emetic not only uncertain but even dangerous in operation; and whenever the mental disorder is complicated with apoplectic or paralytic tendency, the use of this remedy is positively contraindicated. Haslam, for instance, saw apoplexy and palsy of the limbs follow the administration of an emetic in a person in whom there was vascular accumulation in the head. This peculiarity, which is unquestionable, it is not easy to explain. For, generally speaking, full vomiting is believed to be a powerful means of emptying the vessels during inflammation. The mechanism of this process, however, appears to possess something which, by deranging the pulmonary circulation or impeding its freedom, tends to favour congestion of the cerebral vessels, and which, though temporary in its action, leaves a permanent effect on the vessels of the latter organ. In the congestion of fever, nevertheless, these injurious effects are not observed. This peculiarity M. Guislain attempts to explain by distinguishing between simple cerebral vascular orgasm of nervous character only, and that which depends on genuine inflammation. The circumstance which seems to constitute the hazard in apoplectic dispositions is the tendency which full vomiting manifests to distend, and perhaps rupture the cerebral vessels during the process.

M. Guislain dissuades from the use of emetics in inflammatory affection of the digestive canal, in pregnancy, in great oppression of the chest, in disposition to hæmoptysis, and in hernia.

Instead of full vomiting, emetics in divided or nauseating doses, though more painful and distressing, are sometimes equally effectual, not only in unloading the vessels and excretory ducts of the intestinal tube, but those of the system at large, and of the brain and its membranes. By this method, accordingly, Vos of Berlin has cured a number of insane persons. M.

Guislain nevertheless states, that after several trials of the tartrate of antimony in this manner at the hospital of Ghent, he could not perceive any change in the intellectual faculties of his patients.

Purgative medicines are probably more generally and uniformly indicated than emetics in the treatment of insanity, and are liable to fewer exceptions, whether we regard the form or the period of the disease, the kind of patient, or the morbid states with which it may be complicated. The following indications are delivered by M. Guislain as the result of extensive deliberation and collation of authorities.

1. Purgatives are indicated as derivatives in monomania and in mania. The only exception to this rule is, that after the disease has been of long continuance and is verging to fatuity, which is always connected with great debility, purgatives from their debilitating effects must be used with prudence or altogether abandoned. This exception applies of course to their action as derivatives only. 2. Purgatives may be indicated in mental derangement with costiveness, indolence, and aversion to muscular motion. The reason of this rule is founded on the fact, that costiveness is common to the insane, especially to the monomaniacal. It may be the result of impaired sensibility of the intestinal tube; it may depend on general abdominal obstruction; or it may be the effect of inflammation of the mucous membrane of the colon. To these, we conceive, may be added that relaxed, enfeebled, or almost paralytic state of the intestinal muscular fibres, which follows the long habit of neglecting the alvine evacuations, and which, either as an effect or as a cause, is almost uniformly observed in the insane. In either case, purgatives are not only beneficial, but absolutely necessary. 3. Purgatives are indicated in derangement from suppression of the lochial discharge, of the menstrual secretion, or of the hemorrhoidal evacuation. The effect of purgatives, M. Guislain conceives, is to communicate an increase of action to the several abdominal organs, and through this medium of vital irradiation, to re-establish in the several organs their original secretions, the suspension of which he ascribes to impaired energy, or torpor of vessels. Whatever be the merits of this theory, it is matter of fact, that in instances of suppression of natural discharges, purgatives are highly beneficial in restoring them, and it is impossible to question the propriety of exhibiting medicines of this nature, in attempting the removal of mental derangement, which has been preceded by similar suppressions. In all instances, it is important to consider the collateral circumstances, whether the drastic or the merely laxative operation of purgatives is requisite. The ancients, M. Guislain remarks, employed them with the former intention; the moderns chiefly with

the latter;—a peculiarity which he seems inclined to ascribe to the circumstance of the former not being acquainted with the milder purgatives. The advantage of the latter is, that they can be continued longer, and with less chance of inducing that fatal debility of which M. Guislain, with many continental physicians, entertain such apprehensions, and consequently with greater chance of finally eradicating the disease. From the observations of Hoffman, Vogel, and Ludwig, it results that hellebore, *(Helleborus niger,)* is especially indicated in monomania. But the observations of Cullen show, and the trials of Ferriar prove,* that it possesses no peculiar advantage over the ordinary purgatives, which, to a milder action, unite a greater degree of certainty. The latter author found calomel, though not always successful, yet sufficiently so to justify further expectations from its employment in insanity.

Clysters M. Guislain represents as indicated, but not always admissible, in consequence of the obstinacy of the patient.

Of means which operate on the skin, the warm bath, originally ascribed to Melampus, though condemned by Cullen and Pinel, has been used with advantage by Cox, Müller of Würzburg, at the Retreat at York, Ferriar and Haslam. In the practice of the Retreat it is stated to be most beneficial in melancholy; by Cox and Ferriar, on the contrary, its employment is restricted to the treatment of maniacs. Frank uses it chiefly where insanity is combined with watchfulness and great excitement of the intellectual functions; where the skin is dry and saline, and the disease has followed suppressed perspiration or repulsion of a cutaneous eruption; while Esquirol represents it as most effectual in maniacs who refuse food. Upon the whole, M. Guislain, adopting the conclusions of these authors, recommends the warm bath, beginning at 60° and increasing to 96° F. in the commencement of insanity, previous to the accesion of maniacal paroxysms, and in all cases in which it is desirable to restore a suspended evacuation, and to moderate the excessive intensity of the muscular strength.

The cold bath, as too frequently producing accumulation of blood towards the internal organs, he prohibits absolutely in insanity with plethora, and in that with great debility. Though influenced somewhat by the experience of the English physicians, who he says attach great value to this as a curative means, it is evident that he places little confidence in it, and is more anxious to give the result of the observations of others than any creditable experience of its effects under his own observation. The application of cold to the shaven scalp is a local method of treatment much better adapted to cases of mental derangement; nor is there reason to suppose, as the author seems to think, that this practice only drives the blood from the surface to concentrate it towards the central vessels of the head.

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* "I have used the celebrated melampodium in a great number of cases, so as to purge the patient gently, twice or thrice a-week. I have found no reason to believe that it operates otherwise than as a cathartic."—Medical Histories and Reflections, Vol. ii. p. 125.

The mechanical impulse of a stream of water, as obtained in the different forms of *douche*, next claims attention. He prefers the cold *douche*, which he represents as indicated in mania with concentrated nervous symptoms,—especially determination or accumulation towards the head. From the experiments of Müller and Horn no doubt can be entertained of its occasional efficacy in effecting cures, especially in cases of great violence and fury. It is unfortunate, nevertheless, that it is much in the condition of an empirical remedy, the effects of which cannot be depended on, and which are in some instances sufficiently powerful to be injurious, without proving beneficial.

The bath of immersion M. Guislain represents as more violent than the *douche*, affusion, or local applications, in so far as its utility depends on the dread of threatened drowning with which it unexpectedly inspires the patient. This is by no means at all times a good reason for the employment of any particular therapeutic measure; for it is quite clear, that, independent of the difficulty which must be encountered in persuading the patient to undergo the first immersion, no arguments or promises will induce him to submit to a second. If it cures at the first time, the object is attained. But as this is not always the case, nor to be often expected, it is manifest that the immersion bath is a remedy of which prudence must disapprove. M. Guislain gives a figure of a contrivance for administering this remedy,—improved apparently upon that originally proposed by Willis.

The next kind of agents intended to operate on the skin belongs to the class of counter-irritants, or remedies which, by exciting an irritative or even inflammatory action of the skin, are supposed to transfer to that texture the irritation or congestion of the deep-seated vessels. Of these it appears that neither vesicatories nor sinapisms admit of very general use in the treatment of mental derangement. In chimerical and joyous monomania, the former are represented to be most indicated; but to an advantageous result a second application is requisite. To the same general head the author refers those instances mentioned by Haller and Cox, in which a wound or a blow on the cranium, or, as related by Gregory, the application of the trepan, was followed by a return of reason.

The irritation of the cautery, actual or potential, is of much the same nature, especially where insanity succeeds the healing of an habitual issue. Larrey uses the moxa in nostalgia; and Georget expresses himself strongly in favour of the remedy. But if benefit is to be expected from these means, their application to the head, and especially to the scalp, does not promise much advantage. The cruel, and certainly not very rational experiment of De Haen, is sufficiently well known. This clinical experimenter applied the glowing iron to the denuded cranium of a young man labouring under amaurosis. The patient continued well for the first days after the operation, but died suddenly; and on inspection, the cerebral membranes and the digestive passages were found inflamed. The actual cautery was in like manner applied to the skull of a girl also blind; and four days after she died without betraying symptoms of cerebral inflammation. Inspection, however, showed inflammation of the membranes, suppuration of the *dura mater*, the brain softened and yellow at the spot corresponding to the cauterized bone, and a considerable quantity of serous fluid in the ventricles. It will be well for the practice of the art, if those who have the same confidence in remedial measures have equal candour and sincerity in avowing their errors and defects. What shocking mischief, he remarks, must follow this operation, when the cranium is burnt to its diploe, as is said to have been the case. It is manifest, that in such circumstances the cautery does not produce the effects of counter-irritation, but aggravates the disease already existing, by communicating to the affected organ an additional and more severe affection, and one which, instead of relieving, according to the usual course of morbid actions, must eventually destroy the parts.

When the cautery, actual or potential, is thought expedient, the nape of the neck is the proper situation. But even here, perhaps, its place may be advantageously supplied by the seton, which was used with much success by Perfect and Ferriar.

From the subject of dry friction, on which nothing important is communicated, we pass to that of antimonial frictions, or those in which tartarized antimony, in the form of ointment, is rubbed on the skin till pustules are formed. On this topic M. Guislain has communicated several interesting facts, both from the practice of others and from personal experience.

This method of attempting the removal of mental disorders is much practised by Dr Müller of Würzburg, who, with the most unbounded confidence in its efficacy, employs the stibiated ointment of Autenreith almost indiscriminately in every form of the disease, whatever be its stage, or the cause from which it has arisen. After the example of this practitioner, M. Guislain tried this method first in a young girl of 14, in whom an attack of insanity appeared to depend upon the imperfect appearance of a cutaneous eruption. Pustulation of the shaven scalp, with the use of sulphureous baths, removed the disease a first and a second time. In another case of a woman of 68, in whom the disease appeared to be connected with an apoplectic seizure, after general and local blood-letting had removed the worst symptoms, the patient recovered the use of reason under two courses of the antimonial frictions. In a third case of a lady of 20, in whom the disease was opposed by local bleeding repeated according to circumstances, the frictions brought it first into the state of partial fatuity, and afterwards, though reason was recovered, left her paralytic in the lower extremities. In a fourth case of a man of 49 it retarded the maniacal accession, and apparently rendered it less violent.

In further trials M. Guislain was grievously disappointed. In the institution of Ghent he subjected to the counter-irritation of the antimonial frictions more than 30 individuals labouring under different forms of insanity, and with no one could he recognize the smallest change in the state of their mind. Several of these patients suffered severely from the pustules; in several, inflammation of the conjunctiva, œdematous swelling of the face, and ulceration of the scalp were the consequences of the friction. A more serious evil was, that, as these unfortunate persons could not comprehend the reason of this species of torment, the indefatigable M. Guislain became an object of horror to them, and in all his benevolent endeavours to heal their disorders they saw nothing but the malignity of a demon,—the unrelenting author of their misery. Upon the whole, M. Guislain infers, that in the employment of antimonial frictions for the cure of mental derangement, physicians have been hitherto guided by empiricism alone; that though in some cases it appears to have effected a favourable change, in many more it exercises no control whatever over the malady, and leaves us totally in the dark as to the circumstances which indicate or contraindicate its use; and, lastly, that nevertheless it is most suitable in recent cases, and in those which proceed from the repulsion or disappearance of cutaneous disorders.

Depletion from the vascular system has been often recommended and practised in the treatment of insanity; and the authority of antiquity on this point may be found in the pages of Celsus and Paul of Ægina, and of the older periods of modern medicine, in those of Hildanus. In more recent times Perfect, Joseph Frank, Haslam, and the two Mayos, are the advocates of this practice. It is not improperly observed by M. Guislain, however, that when indications for this practice are established, the just medium has seldom been observed.

Previous to the collection of the necroscopic inspections of the insane which have been made by Greding, Haslam, Marshall, Bayle, and others, it must have been difficult to determine the propriety of vascular depletion for the removal of the disease; and even since the practitioner has become possessed of these documents, it was still requisite to distinguish between those appearances which were the cause, and those which were only the effects of insanity: and even after the determination of this point, it is requisite to know by experience how far the measure is truly remedial. Perfect, we believe, was the first who, in modern times, gave the remedy that kind of trial which is calculated to ascertain its actual virtues. The quantities which he took were so small, 4, 6, 8, or 10 ounces, that it is difficult to conceive how they produced any effect on the system or on the disease. Yet combined with the other remedies, for instance purgatives and setons, the symptoms in general gradually receded, and the patients recovered their faculties. At the interval of some years this practice was much employed, and highly commended by Haslam, who represents it as "the most beneficial remedy that has been employed," and who introduced two changes in the mode of administration;—one in taking it from the scalp by scarifying and cupping, the other in augmenting the quantity taken.

This practice, on the contrary, is loudly condemned by Pinel, Müller of Würzburg, and Georget, all of whom assert that they have seen no benefit from it, and the second that it causes fatuity. This, however, is mistaking the natural tendency of the disease when incurable for the effects of the remedy. M. Guislain evidently hesitates much which side he should adopt, and amidst the perplexity of the conflicting evidence, reminds his reader, that although necroscopic records prove the existence of inflammation in mental disorders, yet certain of the symptoms supposed to be connected with this condition do not derive from vascular depletion that conspicuous relief which is to be anticipated. The home-sick monomaniac, says he, is saved by restoration to the bosom of his family; yet his brain, his lungs, his intestines are inflamed, and this inflammatory condition is subdued by moral treatment. A home-sick soldier again, says he, at the military hospital of Ghent, had leeches repeatedly applied to the belly, but without success; and upon inspection after death, the gastric mucous membrane was found inflamed. Though he admits, therefore, that it is impossible to doubt the efficacy of vascular depletion in removing mental disorders, he maintains that it is not the anchor of safety, otherwise what is the use of all that has been said on the moral treatment.

This reasoning is not altogether sound. To expect that blood-letting is to be a complete cure for insanity, even though the inflammatory nature of the disorder were well established, is unreasonable; much less reasonable is it to imagine that, because blood-letting is occasionally inadequate to cure, and occasionally is misapplied or mistimed, it ought to be always proscribed as useless, if not pernicious. Nor is it less improper to argue that, because the disease proceeds from moral and immaterial causes, the employment of material measures is unnecessary. The great majority of diseases are perhaps in their origin immaterial; but such is the nature of the living textures in which they take place, that very soon they become material changes, and give rise to material products. The object of the physician is to resist these material changes, and counteract their effects; and as he cannot do this by direct means, he employs the indirect, namely, by acting on the materials from which these products are formed, in other words, on the vascular system. To expect advantageous results from the use of blood-letting in the treatment of insanity, three conditions at least are requisite;—*first*, that it be used early and during the inflammatory stage of the disorder, before the morbid orgasm has given rise to new products or organic changes; *secondly*, that it be carried to sufficient extent, either in quantity or by repetition; and, *thirdly*, that the disease be void of complication with organic change in the brain or its membranes. It is manifest, that with these conditions there is ample room for the employment of this remedy with the hope of removing the disease. Of the conclusions at which M. Guislain arrives on this point, the principal are, that blood-letting may be useful in insanity originating in the vascular system, in plethora, in suppression, or metastasis of an habitual discharge, from blows, falls on the head, or insolation, and when inflammation of a thoracic or abdominal organ affects the brain sympathetically; and that, in all cases in which morbid actions, though originally dependent on moral causes, are advancing in any of the internal organs, blood-letting may be of the greatest service.

In examining the method of treatment by tonics, M. Guislain begins by accusing of rash and hasty generalization the system of the elder and younger Mayo, who proposed to treat every form of derangement by blood-letting, long-continued courses of purgatives, cuppings, setons, and refrigerants, to the entire and absolute exclusion of tonics. Several of the exciting causes are manifestly, he argues, enfeebling in their operation; and certainly, after the disease has continued some time, and is verging to *dementia*, it is impossible to doubt the presence of a state of debility and loss of power.

The reasoning of M. Guislain is not here very conclusive. For whatever be the apparent operation of the exciting causes, and whatever be the exact state produced, it is certain that the medium by which the cause produces the effect is almost invariably a state of the vessels in which tonics are, if not injurious, at least of very little use. Even the periodical derangement of menstruating females, which M. Guislain adduces, though not one requiring blood-letting or other evacuations in all cases, is not benefited by tonics, so named, unless so far as they contribute to equalize the circulation, and prevent that commotion in the system which the uterine secretion produces. The form of derangement which most demands the tonic treatment is that produced by inanition; and in this, perhaps, the best tonic is frequent small supplies of light food and wine. In the others it is chiefly after depletion, either by local blood-letting, or purgatives, has subdued the excited stage of the disease, that tonics are beneficial,—much upon the same principle as in cases of fever, when the essential febrile symptoms have disappeared, and the tongue has become clean, the mental imbecility which remains is removed by gradual and cautious supplies of light and nutritious food.

In this manner also did Perfect, Reil, and Ferriar see benefit result from the exhibition of Peruvian bark; and upon the same principle is to be explained the success of Georget, Castel, and M. Guislain himself, as described in the present volume. M. Guislain admits, indeed, that there occur instances in which, with all the apparent indications for the exhibition of tonics, they make no impression on a disease which afterwards yields to blood-lettings; but observes that this does not furnish reason for proscribing the employment of tonics. In short, the general conclusion is, that it is requisite to consider carefully the causes of the derangement, its duration and effects upon the system, and above all, the state of the digestive functions, in expecting benefit from the depleting or the tonic system. According to the author, it is chiefly when the energy of the abdominal circulation is impaired, and when the digestive passages are enfeebled, that benefit may be expected from the latter practice. The medicine most to be depended on is the cinchona, or its alkaloid salt.

Under the head of specifics, M. Guislain considers the effects of anthelmintics when worms are the cause of the disease, the efficacy of mercury and of oil of turpentine. From several trials made with the former mineral, M. Guislain infers that it has no sanative influence to be relied on; and notwithstanding the testimony of Percival as to the latter agent, Horn and the author have been equally unfortunate.

The observations on regimen, which form the subject of the tenth book, we omit, not as useless, but as containing little which requires to be repeated here. On the subject of climate, in the following book, the reader finds some interesting observations on the influence which the physical characters of the Low Countries, especially the province of Zealand, exercise on their inhabitants, compared with their neighbours in Flanders and France, and in the British Islands. On the influence of climate, however, properly so called, nothing precise is communicated; and M. Guislain rather suggests measures for obtaining satisfactory results than furnishes them himself. As in all other cases of deranged health, a temperate atmosphere and pure air, such as are those of the south of France and Italy, are pronounced to be the preferable situations for the residence of the insane; and the vicinity of Liege, Brussels, and Ghent, are distinguished as more salubrious than the northern provinces of Holland. Alas! of the multitudes whose mental faculties require this change of situation, by how small a proportion does M. Guislain consider it can by any possibility be attained.

In the twelfth book, we enter on a division of the subject more generally interesting, and upon which M. Guislain communicates much curious and useful information. In proceeding to take a statistical view of the institutions for the reception of the insane in the Low Countries, M. Guislain pronounces a severe censure upon the mismanagement of these places, and the entire want of feeling in the mode in which their miserable inhabitants are guided. The lunatic institutions of North Holland labour, he says, under two capital errors,—the first, that of no general measure or uniform rule for their administration; and secondly, that the direction of them is wholly civil, while it ought to be either entirely or chiefly medical. Every lunatic institution he represents as an independent establishment, under no control and amenable to no jurisdiction, or, if it is, under that of civil hospitals. Some few are placed under the inspection of a special commission, whose duty is to watch over the performance of every thing relating to the administration of these houses. Though this mode of direction is less faulty than the former, it is objectionable in never descending to the details of management, in which abuses invariably begin; and in both instances, a grievous error is committed in making the physician a secondary person only, and in limiting his duty not to the treatment of insanity, but to that of those diseases by which the insane may be accidentally attacked.

Everywhere M. Guislain accuses his countrymen of neglecting entirely the moral qualities of those to whom the immediate management of the patients is confided; and indeed the picture which he delineates of the want of principle observed in that class of persons, furnishes an example of brutality and depravity so glaring, that it were to be wished that it is considerably overcharged. More than twenty years have elapsed since the feelings of the inhabitants of this country were wrung by an exposition of the atrocities perpetrated in several of the private and county receptacles of this country. It appears that up to the time at which M. Guislain published his work (only two years ago,) similar brutal practices were carried on, and perhaps are still continued, in the Batavian Institutions. "It is painful," says M. Guislain, "but just to say, that interested motives only guide the chiefs of these establishments. To satisfy their wretched avarice, they deprive the poor madman of his necessaries; they adulterate his food; they diminish his allowance; his garments are perfect rags, and between his winter and summer clothing there is no difference. The madman is laid on some sprinklings of rotten straw beside his excrements; and to this you must add the most brutal treatment, in which chains, stripes, and blows, are marks of tenderness compared to the chilling damps of their abodes, and the revolting indifference of the attendants; and you have not a perfect picture, but an incomplete sketch of the sufferings of men in these dens of desolation."—"What a contrast," he humanely asks, "to the multitude of persons who, in the daily pursuit of enjoyments of every description, pass these abodes of wretchedness a thousand times, without bestowing a thought on the inhabitants or their fate, or what ameliorations their wretched existence might admit."

It is easy to see, that of the interior and domestic management of such places, it could not always be easy to obtain exact information; and M. Guislain accordingly was disappointed in many of his efforts. In several his applications were received by a decided refusal; in others the time was spent in promises, which terminated in nothing; and in others admittance was forbidden with the utmost rudeness and arrogance to persons of the highest consideration who had undertaken to procure the author the necessary information. To these heavy charges he makes an honourable exception in favour of the physicians engaged in the administration of the insane hospitals in the French provinces, Flanders, Brabant, Zealand, and some institutions of North Holland, from whom he received, directly or indirectly, unreserved reception, and the most sincere offers of service. We proceed, however, with the individual institutions.

Gheel. This institution, which is for the reception of the insane of Brussels and the adjacent country, is in some respects the wonder of Holland. It consists of a space of four or five leagues circumference, in which a great number of insane enjoy liberty almost unrestrained.

Gheel is a small town four leagues from Thurnhaut, ten from Brussels, and eight from Anvers, in the centre of immense wilds of broom, on an elevated soil, and amidst pure air. The civil hospitals pay 90 florins of annual board for each individual sent, exclusive of the expence of dress. The origin of the institution, which is religious, and is dated from the 15th century, is ascribed to St Dymphna, who, though one of the most obscure saints of the calendar, is reported to have wrought miracles in this place in curing lunatics. Each patient upon his arrival is consigned to a house attached to the church consecrated to the patroness-saint, and after spending some days in this place, he is placed with a keeper or nurse-tender.

Most of the patients are lodged with the peasants; those in easy circumstances are placed in the village, and with the wealthy farmers; and the whole are under the superintendence of commissaries. The keepers are obliged to treat the patients with the utmost possible tenderness. The hand-cuffs and chains with which most of them are shackled, are removed the moment of their arrival, and this indulgence is followed by the happiest results. The most furious madmen become manageable, and at once respect their liberators, and repose confidence in them. Peaceable maniacs enjoy almost unbounded liberty. Those who betray vicious propensities are closely watched, and the furious are secured in bed. They are occupied according to their taste and strength. Some assist in the labours of the field; others, especially women, amuse themselves in knitting; and some are said to be capable of giving lessons in music and writing.

All of them enjoy perfect health. The account of the apothecary for medicines supplied, including wine, never exceeds 500 francs, or about L. 20 Sterling annually. The annual average of thirteen years appears to be about from 30 to 31 patients. A typhoid fever, which affected them very generally in 1816 and 1817, did not cause much mortality; and the severe winter of 1822 was not remarkable for the number of deaths. The following table gives an idea of the population-movements of this institution; of its entries, its cures, and its deaths:—

	Entries.		Cures.		Deaths.	
	M.	W.	M.	W.	M.	W.
1809,	53	60				
1810,	7	11			1	5
1811,	9	15	4	6	3	7
1812,	3	2	1	1	2	3
1813,	10	16	2	2	1	5
1814,	9	17	7	5	1	5
1815,	9	11	4	3	3	4
1816,	7	6	5	8	5	6
1817,	15	27	4	5	8	5
1818,	11	10	11	6	4	4
1819,	6	6	1	2	2	6
1820,	8	8	7	6	5	7
1821,	5	8	2		4	2
1822,	16	13	3	1	5	5
1823,	9	14	3	3	1	5
	177	224	54	48	46	68
	401		102		114	

Of 401 persons, the entire number resident or admitted, 177 are men, and 224 women,—of whom 54 men and 48 women recovered, and 46 men and 68 women died. The mortality is to the entries, therefore, in the ratio of $\frac{2}{7}$, and the cures in the ratio of $\frac{1}{4}$ to 1. The number of females admitted is greater than that of males, and the mortality among them is more considerable.

Liege.—At this place are two houses for lunatics, one for men, the other for women. Statistical tables of the mortality and cures M. Guislain found it impossible to obtain; and his correspondent states, that they are badly organized, rather receptacles than hospitals, and that he knew of no instance of cure affected by the aid of medical art enlightened by philosophy.

Maaestricht.—This, which is an establishment for both sexes, is a receptacle for those persons whom justice deprives of liberty in consequence of misconduct. The administration of civil hospitals pays the director of this institution the extraordinary sum of 40 francs per month for the maintenance of each maniac; and notwithstanding this liberality in rewarding the cares of the director, the mortality is high.

	Entries.		Cures.		Deaths.	
	M.	W.	M.	W.	M.	W.
	6	12				
1810,	3	1		1		
1811,	4	1		2	1	
1812,	4	2	4	1		1
1813,	1	1	1	3	4	2
1814,	2	8	2	1	1	3
1815,	5	9	1	7	2	3
1816,	6	5	1	3	2	3
1817,	3	9	2	2		4
1818,	3	2			1	3
1819,	5	1	6		2	2
1820,	5	1				1
1821,	2	3	1	2		3
1822,	5	5	2	1	2	2
1823,	1		2	1	2	2
	55	60	22	24	17	29
	115		46		46	

The mortality is $\frac{2}{5}$ths of the whole, and is equal to the number of cures.

Tournay.—Previous to 1821 the lunatics of this city were confined in a narrow, dirty, damp building, in which it is said sickness was frequent, and the mortality great. At this period, a large and commodious building of two flats, and enclosing two courts of considerable extent, was erected at Froidemont, a village about a league from Tournay. One court is the walking-ground for the lunatics; the other serves the purpose of a garden; a third, of more limited dimensions, is allotted to the turbulent and furious maniacs. Necessaries are erected apart from the house. The lunatics of this institution are well fed. The attendance is conducted with good order; and maltreatment, either in word or deed, is rigidly forbidden. The furious patients are confined in small cells, and sleep on straw. They are allowed to take air occasionally; but they are still chained, and some of them have iron shackles covered by leather. The house is attended by the Brothers of La Charité,—a religious order devoted to the relief of suffering or unfortunate persons, and on whose unwearied benevolence M. Guislain bestows the highest eulogy. The table of admissions and results for ten years is as follows:

	Entries.		Cures.		Deaths.	
	M.	W.	M.	W.	M.	W.
1812,	12	10				
1813,	1	1	1	1		2
1814,	8	5	4		3	2
1815,	2	3	2	3	1	1
1816,	5	5	1	4	3	1
1817,	4	6	4	2	1	2
1818,	2	5	1	2	4	1
1819,	3	4		4		1
1820,	4	1	1		1	2
1821,	4	1			1	
	45	41	14	16	14	12
	86		30		26	

The mortality is somewhat more than $\frac{1}{4}$th, and the dismissions almost $\frac{1}{3}$d—a fact which, as the author observes, demonstrates how favourable to recovery is the accumulation of a small number of patients.

Louvain possesses two establishments, one for each sex; that for the men attended by the Brothers of Charity, the other by the Black Sisters. Each hospital consists of a building placed in a healthy, cheerful, and elevated situation; and both are distinguished for cleanliness and an air of liberty. In the men's hospital the furious are separated from the quiet lunatics. The convalescents walk in a court agreeably ornamented with flowers. Each patient occupies a separate cell. The convalescents and the manageable patients are placed in the upper floor. For the boarders a particular quarter is reserved. The following tables show the admissions and results comparatively among the two classes of pauper and boarded maniacs:—

	Paupers.			Boarders.			Females.		
	Admission.	Cures.	Deaths.	Admission.	Cures.	Deaths.	Admission.	Cures.	Deaths.
1809,	15			12			18		
1810,	2	1	5	2	1		2	1	
1811,				3	2	1	2		
1812,	2		1				4	5	1
1813,	1		1	4	4		5	1	2
1814,	5	3	2	8	5	3	2		
1815,	5	2	4		2		6	3	7
1816,	7	3	2	8	4	2	7	5	4
1817,	10	8	1	4	2	1	7	2	4
1818,	9	6	3	6	4		12	4	3
1819,	4	3		7	5	1	5	4	2
1820,	9	6		4	3		5	1	2
1821,	7	4	1	6	6		11	5	
1822,	5	2	1	9	5	1	2	2	2
1823,	3	1	1	9	1	1	5	3	1
	84	39	22	82	44	10	93	36	28

In this table, which shows the admissions to be nearly equal in the pauper and in the boarders' side, after making from the latter the deduction of three persons confined for civil causes, the cures are more numerous in the boarders' list, and the mortality is not one-half of that which takes place in the pauper department of the institution. In the latter case it is rather more than $\frac{1}{4}$th; in the former it is not $\frac{1}{8}$th of the admissions. If from this any conclusion can be derived, it is that the sanability of insanity may be increased, and its mortality diminished, by moral, medical, and domestic treatment, especially that attention to small comforts and petty indulgences which compose so much of the ease, if not the happiness, of ordinary life. Among the females of this institution, however, the recoveries are neither so frequent, nor is the mortality so small, —a peculiarity which M. Guislain thinks cannot be explained in any other mode, than by ascribing it to individual causes. The greater delicacy of the female constitution is the only general circumstance which he thinks can account for this difference of mortality.

Anvers possesses for lunatics a neat well-constructed building, placed in a vast plain, where it enjoys the best air. Destined for the reception of patients of both sexes, it is so arranged that it contains two spacious courts to accommodate the men and the women separately. Most of the insane occupy separate cells; most of which, however, are empoisoned by the pernicious arrangement of a necessary in their interior. The windows are small, too high, and grated. In other respects extreme cleanliness and order prevail in this establishment. The food is good ; the patients are engaged in suitable occupations, and treated with kindness and address. There are no repulsive means of repression, and no chains ; seclusion alone is employed.

	M.	W.	M.	W.	M.	W.
1814,	59	71				
1815,	14	21	7	4	6	6
1816,	16	26	7	12	5	5
1817,	23	35	9	13	4	15
1818,	16	16	8	9	7	11
1819,	15	15	9	9	8	16
1820,	16	15	4	9	5	13
1821,	12	26	6	13	5	3
1822,	12	29	11	8	6	9
1823,	14	31	10	19	3	11
	197	285	71	96	49	89
	482		167		138	

Termonde.—The mad-house of this place, which is under the direction of the hospitals, is well constructed, and with a few changes would make an excellent establishment. It consists of two large courts, one for men, the other for women. Each patient occupies a separate cell ; but the construction of these chambers is faulty. They have no other windows than a narrow opening made above the door of each ; the pannels of the doors are heavy, and the doors are armed with terrible grates, which give the house the aspect of a prison. Among the means of restraint chains occupy the first rank ; and a patient with the slightest degree of fury or violence is instantly subjected to these repulsive measures. The patients, nevertheless, are said to be treated with mildness. The food is good, and the greatest order and cleanliness are observed in the institution. Medical assistance is not afforded unless in the case of accidental disease.

In 1802, in this institution were only 5 individuals. To 1823, 198 cases were admitted, forming a sum total of 203, of whom 53, about 1-4th died, and 79 were dismissed as recoveries. The admissions increased principally after 1814 onward to 1823, when the number admitted was 19. In 1819 the greatest number of recoveries took place, amounting to 13 ; and in 1816 and 1822 the greatest number of deaths, being 6 in the former year, and 7 in the latter.

Ghent contains two receptacles for maniacs of each sex, both placed within the town.

The first, named the *Old Rasphouse*, is a building of Gothic architecture, formerly used as a place of confinement; and at present it is described as a frightful prison, without any thing useful or convenient as an asylum for the insane. A damp dungeon is used as a common hall for lunatics of every description; above this is a common dormitory, cold, comfortless, and dirty; and both chambers look into a low, damp, little court. A small quarter is set apart for the lunatics who board; but it is almost as filthy and disgusting as that of the paupers. The furious patients are confined in a dismal dungeon containing two rows of cells with palisades—a place more suited to cause the most furious madness than to cure the mildest derangement. The means of restraint are the palisaded chamber, chains, the coercion-chair,—the strait-waistcoat,—and recently the rotatory-chair. The food is nevertheless excellent. The house is under the direction of the hospitals, is attended by the Brothers of Charity, and receives the medical cares of a physician and surgeon of the civil hospitals.

The hospital for female lunatics is a well-organized regularly constructed establishment, in a healthy situation, and occupying a vast extent of ground. It surrounds a large court, the centre of which forms a kitchen garden. The lateral walls of this court present long covered corridors, containing a range of small chambers, each of which is allotted to two, three, or four patients. The excellent arrangements of this establishment form a striking contrast with that of the male lunatics.

A large court in the bottom of the building is reserved for the furious. The institution contains common sleeping apartments, working and meeting halls; and the whole is placed on a level with the ground, so that the building consists of one floor only, excepting the left lateral part of the front court, on which there has recently been erected a second floor for the accommodation of convalescents and peaceable patients. The means of restraint are the strait-waistcoat, confinement, and chains, the last of which, however, are little used.

This establishment is managed by the Sisters of Charity, under the particular inspection of M. Triest, an enlightened and benevolent ecclesiastic, and under that of the hospital commission. On the assiduity, the gentleness, the benevolence, and affability with which these pious females discharge their duties to the inmates of this institution, M. Guislain bestows the highest praises. The medical duties are performed by a physician and a surgeon, who are paid by the hospitals. The lunatics are well fed.

It might be reasonably expected, that of these two institutions the latter should have a remarkable advantage in presenting a much smaller rate of mortality, and a much larger proportion of cures. While the rate of the latter, nevertheless, is much the same in both institutions, it is a singular, and not very easily explained fact, that the rate of mortality is much greater in the female than in the male institution. The following table shows the contrast:—

	Men.			Women.		
	Admission.	Cures.	Deaths.	Admission.	Cures.	Deaths.
1808,	44			55		
1809,	3			13	7	4
1810,	2	1		19	7	6
1811,	5	1		17	8	8
1812,	9		3	7	6	4
1813,	6		2	11	3	8
1814,	8		3	19	8	9
1815,	20	5	6	23	9	7
1816,	20	9	6	19	8	7
1817,	31	12	11	18	7	8
1818,	23	10	6	24	12	3
1819,	23	12	6	14	8	7
1820,	27	13	3	16	11	7
1821,	30	13	6	28	6	8
1822,	23	13	4	12	5	11
1823,	18	5	2	21	8	7
	292	94	58	316	114	104

The number of dismissals not cured is included in the cures, since the records of the institutions indicate no difference.

From these tables results the extraordinary fact, that of 292 persons admitted into the Rasphouse, 58 deaths only take place, about ⅕th actually less than in any of the institutions hitherto mentioned; whereas of 316 individuals admitted into the female institution, so much superior in all its internal and domestic arrangements, not fewer than 104 deaths, nearly ⅓d of the whole, take place. This calumniated dungeon of a Rasphouse actually witnesses within its damp and cheerless cells a greater number of recoveries of insanity than any other institution in Holland; and the establishment which philanthropy itself has constructed and manages sees by far the largest proportion of fatal cases. "In the former hospital," says M. Guislain, "are seen only men chained or locked in gloomy dungeons; we find only a disgusting dismal prison, too small for the number of insane lodged in it. In the female institution every thing wears an aspect of humanity, pleasure, and freedom. Whence this difference in the rate of mortality? Can the alarm at seeing himself confined in a dismal prison make the madman return to himself, and dispose him to reflection?"

Velsique.—At this place, some leagues from Ghent, is a private establishment directed by nuns, to which are admitted only females as boarders, and who are generally members of distinguished families at Ghent. The house is well constructed, and is placed in a situation where the inhabitants enjoy the best air. They are treated with great attention and humanity; yet the mortality attains the extraordinary rate of exceeding the half of the admissions. On the 31st December 1809, there were in this establishment 22 lunatics. From this period to 1823 inclusive, the admissions were annually 2 or 3, forming a sum total of 29, or of 51 for the whole number of residents. Of these during this period 19 only recovered and 27 died, the remaining 5 having left the institution uncured. One reason of the high mortality of this receptacle is, that many of the patients are sent to it only when they are understood to be in a state of incurable fatuity; and, consequently, the house is to be viewed rather as a convenient place of seclusion than as an insane hospital, properly so called.

Bruges.—Of all the establishments yet enumerated, none can be compared in point of internal administration with the hospital of St Julien at Bruges. The director of this institution, M. Rieland-Canneel, is represented as a sincere philanthropist, who possesses the moral and physical qualities necessary to the office which he occupies. The care with which he studies mental diseases, the efforts which he makes to ameliorate the condition of the patients committed to his care, and the zeal and punctuality with which he discharges his duties to them, are the smallest qualities of this excellent person.

The institution is situate in a very salubrious quarter of the town. The arrangement of the building, which is very irregular, leaves every thing to be desired; but by means of judicious changes it has been converted into a commodious establishment, embracing the principal conditions required for an insane hospital. When the buildings now constructing are finished, it may accommodate 260 persons. It consists of four general divisions, one for male, another for female maniacs, a third for convalescents, and a fourth for patients who are boarded.

In the male quarter of the institution 24 cells are reserved for accommodating furious patients. Surrounding a court are covered corridors, a common hall, a refectory, and a dormitory for patients with lucid moments, which may accommodate 32 individuals. This division also contains an abode for convalescents, consisting of a common hall, a court, a dining-parlour, and a dormitory.

In the female quarter are cells for the furious; a dining-parlour, a hall, a spacious court, a dormitory consisting of 24 chambers; and a hall or parlour for accommodating a few idiots. A directress over each division is charged with the personal care of the insane.

The convalescent quarter consists of a court and a garden, a dining-parlour, a working hall, and a dormitory containing seven chambers capable of accommodating three patients in each. From the authority of M. Rieland, the author states that the desire of inhabiting this agreeable abode accelerates greatly the recovery of the insane.

The boarders occupy the part in which the director resides. They have permission to walk in the gardens under the inspection of attendants. Three cells are reserved for the furious.

There is also an hospital for those attacked by accidental disease, on occasion of which only, or when called, a physician and a surgeon paid by the hospitals exercise their functions. The establishment contains baths, *douches*, and recently a rotation-chair has been constructed. Seclusion and the strait-waistcoat are the only means of restraint. Moral treatment is much used. Those with lucid intervals work;—the men dig in the gardens, the women amuse themselves with knitting, sewing, washing, &c. The arable lands adjoining to the hospital are cultivated by the director. There is a brewery, a bake-house, a mill, and all the appurtenances of a farm. The commission of hospitals has merely the inspection of this establishment. The following is the state of its population from 1809 to 1823.

	Admitted, m. & f.	Cured.	Died.		Admitted, m. & f.	Cured.	Died.
1809,	139			1817,	64	31	19
1810,	36	19	8	1818,	47	26	13
1811,	28	19	18	1819,	37	27	9
1812,	30	14	11	1820,	45	25	17
1813,	25	14	12	1821,	54	37	18
1814,	34	21	12	1822,	44	22	11
1815,	42	30	7	1823,	47	28	11
1816,	53	20	17				
					726	333	183

The recoveries are not quite one-half; and the mortality is about one-fourth.

Middelburg.—An establishment for both sexes under the direction of the civil hospitals. The inmates sleep in common in large apartments, each in a separate bed; and the men separate from the women during the night only. The means of restraint are leathern bracelets, shackles, the coercion-chair, and the palisade apartment. Medical assistance is given only in cases of accidental disease.

The number actually resident in this establishment at the time M. Guislain wrote, was 27. In 1823 there were two admissions, three deaths, and no recoveries.

Amsterdam.—At the distance of a quarter of a league from the city is an establishment which combines the twofold character of a civil hospital and a lunatic asylum, enclosed by a marsh, and encompassed by damp meadows, which are almost always submerged in winter. Its plan, though regular, does not answer the purpose of its destination, so far as regards a lunatic hospital. The section assigned to the insane consists merely of wards which look out on pretty large courts. But the lunatics are lodged indiscriminately, without regard to the form or degree of disorder, though without communicating with the other patients. They sleep in beds placed in a row in the same apartment, which serves at once for dormitory, refectory, and common hall. The furious alone occupy separate apartments.

Some patients are boarded at the rate of 6 florins per week, for which they receive particular attendance, have better food, and occupy a separate apartment. Some are taken for a payment of 50 florins annually, but derive from it no advantage.

The institution is under the care of a director and a directress. To two men-servants and two females only the care of the lunatics is confided; and it is justly remarked, that it is almost inconceivable, indeed it is altogether inconceivable, how so small a number of attendants can take all the measures of inspection required by the number, by no means small, of invalids. When we state that in 1819 the admissions amounted to 106 of both sexes, and that in 1823 the institution contained 45 men and 108 women, it is easy to see that there can be little inspection or attendance within its walls, or that, whatever it be, the insane must minister to each other.

From a tabular view of the admissions, discharges, and deaths furnished by M. Thyssen for a series of years from 1792 to 1796 inclusive, it appears that the discharges are to 1 in the ratio of $0.39\frac{1}{5}$, and the deaths in that of $0.35\frac{3}{8}$ nearly.

For a subsequent period of 5 years, extending from the 1st January 1809 to the 1st January 1814, of 341 persons treated in this establishment, 137 were dismissed, and 133 died. Consequently, the rate of discharges is represented by $0.40\frac{3}{17}$, and that of mortality by 0.39 nearly. In a subsequent period of 5 years, from the beginning of 1814 to that of 1819, the cases treated were 399, of whom 146 were discharged, and 110 died. This gives $0.36\frac{3}{5}$ for the discharges, and $0.27\frac{3}{5}\frac{2}{7}$ for the deaths, which is doubtless an improvement on the score of mortality. This diminution is ascribed by M. Thyssen to the cessation of a diarrhœal disorder, which previous to this period was endemic in several wards of the institution, and from time to time thinned their population.

The following table communicated by the director exhibits the admissions, discharges, and deaths for the years from 1809 to 1823 inclusive:

1809,	81		
1810,	61	22	23
1811,	52	18	32
1812,	53	39	39
1813,	42	27	17
1814,	47	23	24
1815,	58	27	16
1816,	64	36	32
1817,	66	25	18
1818,	92	35	30
1819,	106	42	48
1820,	95	48	41
1821,	92	51	37
1822,	77	45	48
1823,	86	36	40
	1072	474	445

This gives $0.44\frac{29}{134}$ for the discharges, and $0.41\frac{1}{2}$ for the deaths, during the course of 15 years. This prodigious mortality, however, which is rather more than $\frac{2}{5}$ths, is made by another table furnished by M. Niewenthuis, author of a topographical work on Amsterdam, to approach very near to a half of the whole admissions. In 1797 there were in the institution,

	Individuals.
	117
The admissions to 1817 were	1131
Entire admissions for 20 years,	1248
Entire deaths for 20 years,	604 = 48 per cent.

It is by no means wonderful that M. Guislain represents the insane establishments of his country as in the worst possible condition, and conducted in the most miserable manner. It is highly probable that the insalubrious situation and the physical circumstances of the Amsterdam hospital contribute mainly to this lavish waste of human life; for they must tend not only to aggravate the disease for which the inhabitants of this receptacle of mortality are sent to it, but to induce others, which are well known to operate powerfully in shortening life and thinning communities. Local situation and physical peculiarities, however, cannot be the sole causes of this high mortality. For it occurs, though in a smaller degree, even in those which are placed in most healthy situations, and constructed on superior principles, and where, as there are no proofs of epidemic or endemial maladies, the sickliness and mortality must be imputed to individual causes or circumstances in the domestic management of the population of these establishments. The following table exhibits a general comparative view of the whole results already given separately, and shows almost at one glance the death-doing qualities, *το θανατοφορον*, of the Batavian lunatic asylums.

	Admitted.	Recoveries.	Deaths	Rate of deaths.	Men admitted.	Wom. admitted.	Men cured.	Wom. cured.	Men dead.	Wom. dead.
Gheel,	401	102	114	$\frac{2}{7}$	177	224	54	48	46	68
Maaestricht,	115	46	46	$\frac{2}{5}$	55	60	22	24	17	29
Tournay,	86	30	26	$\frac{1}{4}$	45	41	14	16	14	12
Louvain,	84	39	22	$\frac{1}{4}$	84	93	39	36	22	28
	79	44	10	$\frac{1}{8}$						
	93	36	28	$\frac{1}{3}$						
Anvers,	482	167	138	$\frac{2}{7}$	197	285	71	96	49	89
Termonde,	203	79	53	$\frac{1}{4}$						
Ghent,	292	94	58	$\frac{1}{5}$	292	316	94	114	58	104
	316	114	104	$\frac{1}{3}$						
Velsique,	51	19	27	$\frac{1}{2}$						
Bruges,	726	333	183	$\frac{1}{4}$						
Amsterdam,	1072	474	445	$\frac{3}{7}$			233	243	205	233
	4000	1577	1254				527	577	411	563

In this table we find the rate of mortality to vary from $\frac{1}{8}$, which is the lowest, and confined to the pensioned patients or boarders of one institution only, and $\frac{1}{4}$, which is the most common, to $\frac{1}{3}$, $\frac{2}{5}$, $\frac{3}{7}$, and $\frac{1}{2}$, which is the highest, and also is confined to one institution, the private female one of Velsique, where, for reasons already explained, the mortality might be expected to be high. Of all the ordinary institutions for the reception of pauper lunatics, that of Amsterdam is certainly the most remarkable in this respect, its mortality being, according to the calculation of M. Guislain, at least $\frac{3}{7}$, according to our own $\frac{2}{5}$, and according to the data of M. Niewenthuis nearly $\frac{1}{2}$.

From the same table it results, that the number of females admitted into insane institutions in Holland is invariably greater than that of men; and in Amsterdam, for a series of thirteen years, the number of the former has very generally more than doubled the number of the latter admitted. The proportion of cures among the men is greater than that among the women in the ratio of $0.39\frac{2}{3}$ to $0.37\frac{1}{3}$; and conversely, the mortality among the former is less than that among the latter in the ratio of $0.30\frac{2}{3}$ to $0.36\frac{3}{4}$. It further appears, that the season of the year has some influence on the production of mortality among the insane. Esquirol showed that the months of September, October, December, January, and February, are more remarkable for mortality than the rest of the year. From some observations, however, made at the Rasphouse of Ghent by M. Guislain, it results, that, during the months March, April, and May, the greatest mortality takes place,—that next to these, June, July, and August, are most fatal,—and that the two winter quarters, from September to February inclusive, are those in which the smallest number of deaths takes place.

The details now delivered M. Guislain proceeds to apply to the formation of rules for the construction, organization, and domestic management of good and efficient lunatic institutions. Into these we feel that our limits will not permit us to enter, further than in the manner of mere enumeration; and for this our readers would not thank us. The means of restraint or coercion are considered at sufficient length; but the author, after enumerating all, does not appear to distinguish the merits or the disadvantages of any with much decision. To mere seclusion, however, in a suitable apartment, he appears to be most partial. He justly abuses the oil-cloth sack as a brutal and most dangerous contrivance. In short, it is neither more nor less than downright suffocation; and Horn of Berlin had the pleasing spectacle of seeing a poor female whom he inclosed in this manner at night, a lifeless corpse in the morning. The whimsical measures contrived in Germany are indeed rather proofs of the indefatigable ingenuity of their authors than of much knowledge of the best methods of managing madmen. Such are the *extension-ropes* of Horn, the *mask* of Autenreith, and the *wheel* of Reil. The *girdle* of Haslam and the ordinary *strait-waistcoat* are allowed to be superior to all other means, both in simplicity and efficiency of operation.

In the thirteenth and last book of his work, M. Guislain proceeds to make some observations on the recriprocal influence exercised by diseases in general on insanity, and by insanity on other maladies. This subject has been already partially considered by Greding, Ferriar, Haslam, Pinel, Esquirol, and Georget; but we believe that nowhere does it receive so much attention as in the present volume. The influence of fevers on insanity, the mutual influence of consumption and insanity on each other, and the influence of such nervous disorders as epilepsy, palsy, &c. on the disease, are examined in detail.

Recorded facts, and the results of personal observation, lead him to admit a close connection between the pulmonary system and the brain. Though mental derangement may take place in the course of pulmonary consumption, and suspend the progress of that disease, this is by no means so invariably the case as has been represented by authors. Haslam, indeed, was perhaps the first to controvert the verity of this conclusion, and has given strong testimony that the insane are by no means exempt from pulmonary consumption, and that they are as likely to die of this disease as those whose intellects are clear and unclouded. * This inference has since received additional confirmation from the experience of Esquirol, in the Journal of Hufeland, from Kortum, whose cases are quoted by M. Guislain, and from the author himself.

On epilepsy and palsy, as connected with or complicating mania, it is unnecessary to dwell. In speaking of the researches of M. Bayle, we took occasion to show that they are generally to be traced to the same common pathological cause of which, with the mental derangement, they are to be regarded in general as common symptoms, or concurrent effects. The observations of M. Guislain, though not so full as those of MM. Bayle and Calmeil, tend nevertheless to the same general conclusion, and need not be here reproduced in another form.

Here, therefore, for the present we take leave of M. Guislain, not without a strong recommendation of his work to the attention of those readers whose inclination or whose duties lead them to study the nature, causes, and treatment of mental disorders. To them it is invaluable, in concentrating with much impartiality the information of the best and most creditable authors, in forming in general accurate judgments without any mixture of dogmatism or bigotry, and in displaying a spirit of benevolent and judicious reform in the management of those unhappy persons, whom accident, calamity, or disease have rendered incapable of acting for themselves.

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* "It is a common opinion that *Phthisis pulmonalis* is frequently suspended by the supervention of mania. Medical books abound with such accounts, and some persons have supposed it difficult, if not impossible, for the two diseases to co-exist. It is not my intention to dispute the accuracy of such relations, nor to question the power which *Mania* may possess in arresting the progress of *Phthisis pulmonalis*, but to state that the converse does not obtain; and that whatever obligations may be due from Phthisis to Mania, the compliment has not been returned. From my own experience I can affirm, that insane persons are as liable to *Phthisis pulmonalis* as others; that numbers of them die of that disease; and that I never saw any abatement of the maniacal symptoms through the progress of consumption." —Observations on Madness and Melancholy, &c. 2d. edit. p. 158, case 31st.

ART. III.—*An Essay on the Operation of Poisonous Agents upon the living Body.* By JOHN MORGAN, F. L. S. Surgeon to Guy's Hospital; and THOMAS ADDISON, M. D. Assistant Physician to Guy's Hospital. London. Longman, &c. 1829. Pp. 91.

ACCORDING to the most received opinions in toxicology, poisons act on the body through one or other of two channels. Either they produce some impression on the sentient extremities of the nerves of the part to which they are applied, which impression is subsequently transmitted along the nerves to the brain, and from that to other parts or organs of the body. Or they enter the bibulous vessels and are carried along with the blood into the heart, by which they are transmitted to the brain or other organs, on which they more especially act. At one time the number of poisons that act through the medium of the nerves was conceived to be very considerable. But the researches of the most eminent physiologists in recent times have tended greatly to curtail the number; and the experiments especially of Brodie, Magendie, and Barry are believed to have proved that a vast number of poisons really act only through the medium of the blood by venous absorption.

Mr Morgan and Dr Addison in their conjunct inquiry undertake to demolish the whole theory of the action of poisons through the medium of the circulation,—to lessen materially the importance of the conclusions which Magendie and Barry have drawn from their experiments,—to modify essentially the received doctrine of the action of poisons through the nerves,—and to set up a new theory of their own,—namely, that all poisons produce their specific effects on the brain and general system through an impression on the sentient extremities of the nerves only, and that when they appear to act through the medium of the blood, they really act only through the sentient extremities of the nerves of the inner coat of the blood-vessels.

Every thinking physician will readily acknowledge with the authors the great interest and importance of the questions which they have undertaken to investigate. The greater number of our most remarkable poisons are nothing else than our best medicines exhibited in large doses; and in consequence it is to be presumed that an exact knowledge of every particular which is capable of being ascertained relative to their poisonous effects must throw light on their therapeutic properties. But this is not all. The operation of certain miasmata and infections, the phenomena of many natural diseases, nay the consequences of some mechanical injuries are so analogous, if not actually identical, with the effects of certain poisons, that a thorough investigation of the mode in which poisons operate cannot fail also to add much useful information for illustrating the science of pathology. Independently of its importance, the investigation of the mode of action of poisons presents to the experimentalist other attractions not less powerful; for, although several of the most eminent physiologists, and only the most eminent, have of late devoted themselves to its study, it must be quite clear to every competent judge, that a great deal still remains to be done in order to give to the toxicological doctrines on the subject that stability which is requisite to justify the application of them to pathology generally. Mr Morgan and Dr Addison then, have acted judiciously in choosing this ground for the commencement of their physiological labours.

Their treatise consists of two Parts, in the former of which they endeavour to overturn the inferences drawn by their predecessors in favour of the action of poisons through the blood, while in the latter they unfold the process of experimental induction, by which they think they have established their own peculiar opinions.

The arguments with which they attempt to disprove the agency of the blood as a medium of action are partly general, partly special.

Among their arguments of a general kind, they maintain, in the first place, that it is contrary to the order of nature to resort to two dissimilar modes of accomplishing the same end. Different poisons produce through the intervention of the brain the same or nearly the same train of symptoms; and we are required by the modern doctrines in toxicology to believe that some of them produce the impression on the brain, by being directly transported in the blood to that organ from the part to which they were applied, while others produce their impression on the brain in consequence of the transmission along the nerves of an impression made by the poisons on their sentient extremities. This supposition, the authors insist, is excluded by the intentions of nature, as rendered obvious by the phenomena of the other animal functions, the general law of nature being not to have recourse to two modes of accomplishing one object.

Farther, not only do poisons which are supposed to act through the blood produce the same effects with those which are supposed to act through the nerves; but there is a great similarity between the sensible consequences of poisons and the sensible consequences of other ordinary morbific agents which cannot act by the transmission of a morbific substance along the blood. Thus the tetanus which occasionally follows wounds does not exhibit any material point of difference when compared with the tetanus which is caused by nux vomica, more especially when that poison is given slowly. In like manner, we might add, the coma caused by an extensive burn of the integuments does not differ materially from that which is caused by opium and many narcotics. In like manner, too, the occasional effects of a gun-shot wound in parts not mortal bear an exact resemblance to the effects of the poison of the rattlesnake when the animal is vigorous,—the symptoms being deadly paleness, laborious breathing, great alarm, excessive prostration, mortal faintness, feeble irregular pulse. Now here again, according to Mr Morgan and his coadjutor, we must suppose the law of nature as to the uniformity of means to be violated and unnecessarily violated, if on the one hand we admit that the wound which occasioned the tetanus, the burn which caused the coma, and the gun-shot wound which overpowered the action of the heart, acted by the transmission along the nerves of the local impression to the brain, and from that to the general system, while, on the other hand, we maintain that the nux vomica, the opium, and the poison of the rattlesnake, produced precisely the same effects on the brain, by being carried in substance throughout its texture in the blood.

" It is contrary to all fair analogy to suppose that any variety observed in the *effect* of a local agent can essentially depend upon the medium by which it is carried into the system.

" As reasonably might it be presumed that at one time the sense of taste was communicated by a branch of the fifth pair of nerves, and at another time by the salivary ducts, as to entertain a belief that veins, absorbents, and nerves individually performed a function of precisely a similar nature.

" On the contrary, every organ in the living system is destined to perform its proper function, and, as far as our physiological researches have yet extended, we are justified in assuming that no two organs in the human body are capable of performing the same function, neither can two functions be performed by the same organ.

" It will not for instance be said, that the sympathy between the brain and stomach is conveyed along the eighth pair of nerves at one time and by the circulating system at another : That when vomiting occurs as a consequence of concussion of the brain, it is occasioned by nervous sympathy ; and that when morbid sensibility of the brain is produced by derangement in the digestive organs, that morbid sympathy is the result of absorption : That there are two roads between two organs, by which sympathy is established, the one leading from the head to the stomach, and the other from the stomach to the head." P. 16.

Again it is agreed, according to the authors, by all physiologists, that some poisons act with a degree of rapidity which is incompatible with the notion of their following the long route of the circulation, and that such poisons, therefore, must act through the medium of nervous transmission alone. We are not sure that Mr Morgan and Dr Addison are quite correct in assuming the concordance among physiologists here insisted on. The rapidity of the action of certain poisons has been greatly exaggerated by some experimentalists, who have used, some of them indefinite, others even figurative language to express the interval before their action begins; and when allowance is made for this source of uncertainty, we believe it will be found, that absorption is almost rapid enough to account for the action, and certainly that some poisons which have been till now universally believed to act through the blood, begin to act with no less celerity than others which, on account of the quickness of their operation, are as generally believed to act by nervous transmission. Strychnia, a poison of the kind now alluded to, has been known to act in fifteen seconds: This is probably not less rapid than the action even of prussic acid, (which has been described as inducing its effects like a cannon-ball or a stroke of lightning,) more especially when we consider that in the experiments with the prussic acid, the poison was projected into the throat, and must thus have been rapidly conveyed in a state of vapour into the pulmonary veins, and in consequence directly into the left side of the heart, while the strychnia was introduced by external wounds, and had thus to follow the route of the systemic veins and pulmonary artery before reaching the pulmonary veins.

But quitting now these general arguments, and turning to the more special criticisms which the authors have made on the experiments by which the doctrine of the action of poisons through the blood is upheld, we find them first assaulting *Mr Brodie*, and endeavouring to show the insufficiency of his experimental researches.

Mr Brodie found that when the thigh of an animal was firmly bound by a ligature, the sciatic nerve alone being excluded, the usual effects of the *woorara*, an American poison, were not induced by its insertion into a wound of the leg, until the ligature was slackened so as to restore the circulation of the limb. This experiment has been repeated with various modifications by different individuals and with several poisons, and always with corresponding results. But Dr Addison and Mr Morgan state two material objections to its validity, as entitling the physiologist to infer that such poisons must act through the blood. The first and strongest objection is, that the maintenance of the circulation is probably essential to the maintenance of the function of the nerves which are to receive the impression. The second is, that possibly the nerves of sensation and voluntary motion, which alone are both in contact with the poison, and in communication with the brain in the above-mentioned experiment, are not the nerves whose function it is to receive such impressions on their sentient extremities. Nay, there is strong presumption that they cannot, for it would be contrary to the order of nature that the same nerves should perform two such opposite functions as that of communicating impressions appertaining to the senses and the impressions caused by poisons. But further, this presumption is turned almost to certainty by the following experiment. The spinal marrow of a rabbit was divided, and the leg then inoculated with strong prussic acid. The animal died in three minutes, which is the usual interval when this poison is introduced into a wound without previous division of the spinal marrow. Now, if we are to suppose that the nerves of the injured part receive and convey the impression caused by the prussic acid, whence does it happen that the effects of the poison are produced, although the nervous communication with the brain is cut off? Yet this poison, according to our authors, must act by nervous transmission of one kind or another, else how are we to account for the extreme rapidity of its action when it is introduced into the throat or into a vein? Of the objections here advanced to Mr Brodie's experiment with the woorara, both may be valid; but at all events the authors insist that either one or other of the reasons unfolded in them,—namely a paralysis of the nerves of the limb, or the want of the requisite function in the particular nerves that are impressed,—will account for the non-action of the woorara; for they have found the same non-action when they substituted for that poison one which is almost universally believed to have the power of acting through the nerves, namely prussic acid. When a ligature was tied round the limb of a rabbit, to the careful exclusion of the sciatic nerve, six drops of prussic acid applied to a wound in the foot produced no sensible effect, while in another animal, whose limb was not tied, the same dose caused death in two minutes and a-half.

The next physiologist who has upheld the doctrine of the action of poisons through the blood, and who receives a large share of the attention of our authors, is *Magendie*. According to Magendie, all poisons act through the medium of the blood. Mr Morgan and Dr Addison's criticisms on the arguments by which this doctrine is supported do not go to deny the entrance of poisons into the blood; they merely tend to show that Magendie's experiments do not bear the inference either that poisons must enter the blood before they can act; or that when they do enter the blood, they act by being carried along with it into the brain.

All Magendie's experiments on this subject are merely varieties of that well known one in which poison was applied to the amputated limb of an animal, the circulation of the limb being preserved by the femoral artery and vein having been previously divided and connected with quills. When the *upas*, a Javanese poison, was introduced into a wound of the limb so prepared, it produced its effects in the usual time. This striking fact certainly proves that the poison may be absorbed, and *may* act through the channel of the circulation. But, according to our authors, it establishes no more. It does not prove that the poison did act only by being conveyed in the blood to the brain, because whenever it reached the part of the femoral vein above the quill it immediately came into extensive contact with the sentient extremities of the nerves of the inner coat of the vein, where the nerves were in connexion with the rest of the system: the upas, therefore, might still act by impressing the sentient extremities of the nerves. If so, his experiment will as little prove, that similar effects may not equally be produced by its contact with the sentient extremities of the nerves elsewhere besides within the cavities of the vessels. These, however, are not the only strictures which are made on Magendie's experiment, and the conclusions he has drawn from it. It is farther alleged by the authors of the work before us, that serious doubts may be entertained with regard to the reality of the action of the upas; because, for purposes of humanity, the experimentalist previously to the amputation of the limb stupefied the animal with opium, and thus, in their opinion, rendered it impossible for him to recognize satisfactorily the effects of the upas amidst those of another poison.

> " As regards the experiment itself we have to observe, that unless the canine race in France differs in some extraordinary manner from that which inhabits other parts of the known world, and unless the chemical discoveries of M. Magendie or his countrymen have produced some preparation of opium, of which the peculiar properties are unknown in this country, we must contend that the preliminary steps to the operation were calculated to render all farther investigations upon the body of the animal altogether useless; for we are borne out by well-known and established facts in asserting, that when a sufficient quantity of opium is thrown into the stomach of a dog, to make a sensible impression upon the organs of voluntary motion, and to produce from that cause those indications of disturbance of the functions of the brain and nervous system which are known by the general term of stupefaction; when in short the animal has been stupefied by opium, we find

that this effect of the powerful operation of the poison upon the system will interfere so materially with the action of any other specific agent as to render it altogether impossible in many cases to determine by external evidence whether, in the event of a fatal termination, the animal has been destroyed by opium or by the other poison, (upas for instance,) or by the combined action of the two." P. 40.

We suspect there is much truth in this criticism, although it appears to be needlessly stated in rather supercilious terms.

Finally, Mr Morgan and Dr Addison turn to the late experiments of Dr Barry on the effect of applying cupping-glasses to poisoned wounds, and are, in our opinion, successful in showing that the failure of the poison to act does not bear the inference which that physiologist has drawn in favour of the doctrine of action through the medium of the blood. Dr Barry introduced into the thigh of a small dog four grains of the *Upas Tieuté*, one of the poisons which contain strychnia; and after observing the usual symptoms of poisoning commence in eight minutes and continue till the animal was on the point of expiring, he applied a cupping-glass to the wound and produced considerable rarefaction by an exhausting syringe. The symptoms were immediately alleviated; and although the glass was removed after remaining only fifteen minutes applied, the animal recovered. The cupping-glass was here supposed to act by withdrawing the poison from the wound and preventing its farther absorption, so that the animal was enabled by the restorative powers of its system to resist what had been previously absorbed. But our authors object to this explanation, that the cupping-glass, in consequence of the strong pressure of its edges, would paralyze the nerves of the part as well as obstruct its venous circulation; and they farther maintain, that, although the function of the nerves was undisturbed, the poison could not act upon them, because the suction of the cupping-glass would remove it from their sentient extremities as well as from the absorbing veins. In short, Dr Barry's experiment, although interesting in regard to the treatment of poisoned wounds, does not appear to the authors of any service towards determining the question now under review.

In the second division of their treatise they proceed to establish the theorem we have already laid down as comprehending their own doctrine with respect to the mode of action of poisons. They maintain that all act by means of an impression made on the sentient extremities of the nerves, which impression is conveyed by the nerves to the brain, and from that to the rest of the body; and that when poisons appear to act through the blood, as when they are thrust into a wound, they really act by producing their primary impression on the nerves of the inner coat of the veins. Their fundamental experiments are the following:—

If in a dog two temporary ligatures be tied round the jugular vein, the vein divided between them, and the ends connected by being tied on a brass tube previously filled with *woorara*,—as soon as the temporary ligatures are removed, the circulation is re-established, and in forty-five seconds the animal is affected by the poison, and death takes place in two minutes. This result is of course explicable on either theory. But suppose that by a particular contrivance, (for the description of which we must refer to the work itself, as we cannot describe it intelligibly without a drawing,) a quill containing woorara is introduced into the cavity of the jugular vein, a ligature being applied between the quill and the heart, while the communication in the opposite direction, or towards the capillaries, is unimpeded:—The circulation being arrested in the vein the poison should cease to act, if it acted only through the blood, or should perhaps act *very slowly* through the capillaries of the coats of the vein; but on the contrary, it will be found that *cæteris paribus* it begins to act nearly in the same time as in the previous experiment, and that death ensues in three minutes and a-half. This fact then appears quite incompatible with the idea that the woorara must be carried in the blood to the brain before it operates, and can be explained only on the supposition that the action consists in an impression, made on the sentient nervous extremities of the inner coat of the vein, and conveyed by the nerves thence to the brain. The greater rapidity of action in the former experiment is owing to the greater extent of surface over which the poison is spread.

Again, if the woorara acted by being conveyed in the blood to the brain, its action should be more rapid when it is introduced into the carotid artery than when it is introduced into the jugular vein, and much more rapid still than when it is introduced into the artery of one of the limbs. Such, however, is not the fact. Two temporary ligatures being tied on the carotid artery of a dog, the artery was divided between them, its divided ends reunited by a tube containing woorara, and the circulation then restored by the removal of the ligatures. In forty-five seconds the animal was under the influence of the poison, and in two minutes respiration ceased. The same experiment was repeated with the femoral artery; and in this instance the symptoms began in forty seconds, and respiration ceased in less than two minutes. On comparing these two experiments with one another, and with that already described as having been performed on the jugular vein, it must appear evident, according to the authors, that the poison could not have acted on the brain by being carried along the blood, otherwise a considerable difference must have been observed in the rapidity of action according to the vessel into which the poison was introduced,—and, on the other hand, that the uniformity of the interval which elapsed before the poison began to operate is explicable only on the supposition that it acts through the medium of nervous impression and transmission.

Lastly, if poisons act by being conveyed to the brain in the blood, they ought to produce their effects when the arterial blood of a poisoned animal is transfused into the vessels of another. In order to subject this point to the test of experiment two dogs of equal size were chosen; in each one of the carotid arteries was divided, and the lower end of the vessel in one was connected with the upper end of the vessel of the other. The poison of *nux vomica* was then introduced into the back of the former. In the inoculated animal the usual violent effects of that poison were produced in no long time and continued for fourteen minutes; yet although the circulation from one to the other was ascertained to be free during all that time, the other dog did not exhibit the slightest sign of the action of the poison. This experiment was subsequently repeated with the jugular veins of two other dogs, the poison being introduced into a wound of the face in the animal, the upper end of whose vein was connected with the lower end of the other. The former was soon violently affected, while the latter did not suffer at all. A still more satisfactory variation of the experiment was tried by making a mutual intercommunication between the right carotid of one dog and the left of another; that is, the lower end of the vessel in each was united by a tube with the upper end in the other; and then nux vomica was introduced into a wound of the back in one only. The animal which was inoculated showed tetanic symptoms in three minutes and a-half, and died in four minutes more; but the other was never affected at all. From these experiments it appears that a poisoned animal by parting with its blood to another neither causes poisoning in that animal, nor is itself saved from the operation of the poison. And the fair inference must therefore be, that the poison does not act by being conveyed to the brain in the blood. No other way remains by which it can act except through the medium of the nerves.

On taking a general view of the whole treatise of Mr Morgan and Dr Addison as now analyzed, it will not, we apprehend, be denied, that they have thrown out very strong, if not insuperable, objections to the inferences which have been drawn from the experiments of Brodie, Magendie and others, in favour of the action of poisons through absorption, and that they have established the most material part of their own opinions on a substantial basis of fact and analogy.

It must be remembered, that they do not deny the reality of the absorption of poisons. This indeed it would be absurd in any one to attempt, after the proofs afforded through chemical analysis of their presence in the blood by Grognier, Gmelin and Tiedemann, Lebküchner, Meyer and others,—or after the singularly interesting experiments of M. Vernière, who has proved that if blood be withdrawn from an animal under the influence of nux vomica, by a vein which leads from the poisoned wound towards the heart, this blood will cause tetanus if injected into the veins of another animal.* The absorption of poisons is clearly and unequivocally proved. But our authors appear to us successful in showing that it is not by the poisoned blood being carried to the brain that poisons operate, and that their action really consists in an impression made on the sentient extremities of the nerves, and transmitted along their course. Thus far their deductions are borne out by their experiments. We are not sure, however, that these experiments will also justify the conclusion, that in all instances the impression which is transmitted passes to the organs ultimately affected through the medium of the brain; neither do we see any reason to infer from them, that the action, supposing it to take place through the brain, is directed always, as they seem to imagine, on the general system. On the contrary, many facts might be quoted to show that it is chiefly particular organs which are affected, and seldom the general system. This, however, is a topic which does not come under the object of the present notice. We shall therefore conclude by recommending the work of the authors to the attention of the reader, and by exhorting the authors themselves not to lose sight of an investigation which they have entered on with so much spirit and success.

ART. IV.—1. *A series of Observations on Strictures of the Urethra; with an account of a New Method of Treatment, successfully adopted in cases of the most obstinate and aggravated form of that disease. Illustrated by Cases and a Plate.* By RICHARD ANTHONY STAFFORD, M. R. C. Surgeons, and lately House-surgeon to St Bartholomew's Hospital. London, 1829. 8vo. Pp. 159.

2. *Further Observations on the use of Lancetted Stilettes, in the cure of Strictures of the Urethra: with additional*

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* Edin. Med. and Surg. Journ. xxix. 450.

Cases. By Richard Anthony Stafford, M. R. C. S. &c. London, 1829. 8vo. pp. 64.

THE modes of treating stricture of the urethra may be referred to two general heads,—*first*, the enlargement of the contracted part of the canal by mechanical dilatation, and *secondly*, the destruction of the diseased portion of the urethral membrane by means of chemical agents.

The first method of curing stricture, which is the oldest, consists in the introduction either of an ordinary wax bougie, as was originally practised with so much success by Daran and Sharp, or of a metallic staff, as has since been done through the contracted portion of the canal a sufficient number of times to enlarge its area and destroy the morbid sensibility of membrane, with which this disease is attended. This method is so practicable and convenient, and since the use of the metallic staff has been found so effectual in removing most of the ordinary forms of urethral stricture, that it has been adopted by the generality of surgeons, and is even much practised by the principal advocate of the armed bougie. The modification by Mr Arnott, though ingenious, is either too complex in execution for ordinary surgical practice, or possesses too little advantage over the metallic staff, to supersede the use of that excellent instrument.

The second method of treating urethral stricture, which was originally contrived by Mr Hunter, and afterwards strongly recommended by the practice of Sir Everard Home, Mr Charles Bell, Mr Andrews and others, consists in introducing to the strictured part a bougie armed with lunar caustic, and retaining it till it kills, or is supposed to kill, the surface of the diseased portion, which is then to be discharged as a mortified slough. This mode of treatment has never come into very general use, and has been employed more frequently in urgent cases of suppression of urine, with the view of removing the temporary obstruction, than of curing permanently the contraction of the canal. The principal objection to the method has been the apprehension, that it is impossible to limit the operation of the caustic, and that, either by mismanagement, or the difficulty of applying it accurately to the diseased place and none else, it is liable to destroy the urethra and its contiguous tissues, and give rise to false passages and urethral fistulæ. Never, however, was objection more groundless; nor is there perhaps a better example of the absurd fears which are liable from the abuse of a name and its concomitant associations to take possession of the human mind. Because the nitrate of silver was denominated a *caustic*, it must, therefore, in all cases burn, corrode, and destroy; and placed especially in a tube so tender and delicate as the urethra, the havoc which it was imagined to cause must be irreparable. Whoever is acquainted with the history of surgery at the time when the armed bougies were brought into notice, is well aware of the outcry that was raised against that very harmless practice.

The truth is, that the caustic powers of nitrate of silver are exceedingly trifling, and scarcely merit the name; and there is no substance the action of which is less spreading. Try it, and you will find, that, instead of possessing too much escharotic power, it actually possesses too little, and in 99 of 100 cases is totally useless for effecting the destruction of parts in that way. It is infinitely inferior to the caustic potass, the substance recommended so zealously by Mr Whateley; and it is one of those anomalies which it is impossible to explain, that that respectable surgeon should have taken so much pains to decry the mildest of all escharotics, and recommend one which is not only the most powerful, but, excepting the butter of antimony, perhaps the most liable to spread and exceed the wishes of the surgeon. In the case of the urethra, chemical knowledge shows that even solid nitrate of silver may be very speedily controlled in its action. It is decomposed and converted into a chloride, by the salts of the urine; so that the moment the fluid passes over it, if it does not expel it forthwith, it converts it into the insoluble chloride, which is inert as to the animal tissues. This, however, is not the case with the caustic potass, which must be converted into soap almost, or opposed by the slough which it forms, before it ceases to act. The false passages and fistulous openings with which the nitrate of silver was blamed are the result not of that substance, but of the stricture for which it is used.

Notwithstanding the truth of these statements, the application of the lunar caustic to strictures of the urethra is so little in use, and is associated in the minds of surgeons with prejudices so strong, that it is by no means likely ever to come into general surgical practice. It is nevertheless certain that there are cases of the disease which require more effectual means than even the metallic staff supplies. Excellent as that instrument is, and highly effectual, not only in enlarging the contracted urethra, but in abating its morbid sensibility, the surgeon occasionally meets with cases in which it is inadequate to effect a permanent cure. By persevering in its use, indeed, the stream of urine becomes enlarged, and is discharged in a proper manner, and with comparative ease; but the cure is only palliative, and after some time the patient all at once, in some instances, finds himself unable to empty his bladder, and is suddenly alarmed with all the symptoms of his former complaint. The catheter or staff is again employed, and the patient again fancies himself well; but upon occasion of exposure to cold, sexual intercourse, or some debauch, he is again threatened with the recurrence of his former torments. In this form of stricture, which is only alleviated and not eradicated by the metallic bougie, the application of the nitrate of silver promises more permanent means of relief. It is, however, withheld by prejudice or apprehension; and the urethral membrane is left much in the same state as to the original cause of obstruction as at first.

There are, nevertheless, examples of urethral stricture, to which not even the escharotic effects of the nitrate of silver can be safely applied, in consequence either of the cartilaginous induration of the urethral membrane, the frequency with which the remedy must be applied, or the extreme irritability of the constitution of the patient. Pathological anatomy shows that this disease, when originating from acute inflammation become chronic, either by repetition or by duration, as generally happens in the course of neglected or mistreated gonorrhoea, consists in a permanent and organic change in the urethral membrane, to the removal of which neither dilatation nor caustic is adequate. " It appears to me," says Mr Stafford, " that permanent contractions of the urethra are produced in the same manner as permanent contractions of other mucous canals, the œsophagus, the intestines, &c. (with the exception of scirrhous contractions;) that a continued chronic inflammation having existed for a considerable time in the part, its vessels are enlarged, and lymph is very gradually deposited in its interstitial structure. This slowly becomes organized and condensed; and by its increase the canal in process of time is entirely blocked up. The membrane, therefore, and the part immediately surrounding it, are rendered more and more indurated in proportion to the length of its continuance, till it even assumes a hardness belonging rather to cartilage than any other structure."

It is of little moment whether the account here given of the mode in which this organic change takes place be precisely accurate or not. That is matter rather of opinion than of actual observation. It is matter of fact, however, that the change takes place, and that in certain inveterate and obstinate cases of stricture, the calibre of the canal may be contracted for the space of half an inch, or nearly a whole inch, so much as scarcely to admit a knitting-wire, by the urethral mucous membrane and its submucous tissue being converted into a thick, grayish, hard, and almost cartilaginous substance. Of this change examples are so frequent in anatomical collections, and to the observation of practical surgeons who are in the habit of examining the urethra in the dead body so familiar, that it is superfluous to dwell on the subject. The question is,—can they be treated by caustic? or if they cannot, by what means are they to be permanently removed?

The first question Sir Everard Home answers in the negative in the second section of the eighth chapter of his first volume, and in the third chapter of his second volume. "In such cases," says this experienced surgeon, "it is to be regretted that we have not a more active caustic, capable of being with safety applied to the urethra, since that is all which is required for their removal; and when the stricture becomes ligamentous, or almost cartilaginous, the lunar caustic makes less impression upon it than could be imagined from any preconceived opinion on the subject."*

The author before us has further enumerated the disadvantages of applying caustic to the ligamentous stricture. But he has confounded in his enumeration sundry effects which are not in all cases to be ascribed to its operation, and which certainly are not necessary to its action; and like many who see nothing but evil in one method, and good in another, he seems to think that the evils ascribed to the caustic follow its use in every case, and in every variety of stricture. On this point we dissent from him entirely; and it has been our object in the foregoing observations to specify the circumstances which indicate or contraindicate the employment of the lunar caustic in the treatment of stricture. It is chiefly to the ligamentous stricture that the lunar caustic is inadmissible; and it is chiefly in consequence of the trifling impression which it makes, and the constitutional disorder which any impression of this kind induces, that it is inadmissible. Shall we add that it is injurious in increasing by the inflammation which follows its use, the very induration which it is intended to remove?

The method by which Mr Stafford proposes to remove this form of stricture, and the contrivance which he substitutes for the armed bougie, though bold, are not irrational, and merit the serious attention of surgeons. The method is neither more nor less than dividing by a cutting instrument introduced within the urethra the morbid, indurated, and contracted portion of the canal, and then introducing a catheter of elastic gum, and allowing it to remain for a few days to prevent re-union, and preclude the possibility of extravasation of urine. Mr Stafford, however, may be allowed to describe his mode of procedure in his own language.

"Having thus pointed out the difficulty and danger of dividing strictures from the perinæum, and the uncertainty and alarming consequences attendant upon the treatment by caustic, I have now to propose another method of treating this disease in its more aggravated and obstinate form. It is the division of the diseased part within the canal of the urethra. The advantages of this mode of treatment are, that it effects with certainty and in a short time, what the caustic is intended to accomplish by repeated and tedious applications, and it is free from the difficulties of the operation for the incision of the stricture (an operation little less painful than lithotomy itself) through the perinæum, thereby saving the patient the inconvenience and misery of a new channel, leaving but little for nature to repair, and at the same time, allowing the urine to flow through its natural passage. For this purpose I have invented two instruments, the one for dividing permanent strictures, while yet a small bougie or wire can be passed through them; and the other to divide those strictures which are impermeable."

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* Practical Observations on the Treatment of Strictures of the Urethra and Œsophagus, &c. By E. Home, Esq. Vol. I. 3d Edition, p. 524. Lond. 1805.

"The instrument for operating on permeable strictures (which for the sake of distinction, I have called the double lancetted stilette,) consists of a round silver graduated sheath open at both ends, of the size of No. 10 catheter, with rather a less curve, and of a stilette, which is also hollow and open at both ends. This stilette is furnished at one end of it with two oblong lancets; and at the other with a handle resembling a button. When the instrument is complete the stilette fits into the sheath, so that by pushing the handle, the lancets will project from the extremity of the tube, and by drawing it back they will retire into it again. When used, the instrument is passed over a wire down to the stricture, and the lancets are thrust forward on each side of it, by which the contraction is made as large as the natural size of the urethra. The armed stilette, intended to divide impermeable strictures, exactly resembles the one just described, excepting that, instead of the stilette being hollow, it is solid, and in the place of two, there is only one lancet."

"Before using the instruments, the exact distance of the stricture from the extremity of the urethra should be ascertained. In the armed catheter, which is intended to divide strictures over the wire. which serves as a guide, the wire must be introduced through the stricture first. The mode of accomplishing this is by passing the smallest possible-sized catheter, made to contain the wire, into the bladder. The wire, which is double the length of the catheter, and blunted at one end so that it may not injure the bladder, is then pushed forward, and the catheter gradually withdrawn, by which the former is left in the canal of the urethra. The armed catheter is then pushed over the wire, until its point rests against the stricture, which is known by means of the graduation, and being held securely in such position, the handle of the stilette is pressed gently and gradually. As soon as any impression is made, the lancets should be allowed to retire into their sheaths, and the blunt point of the instrument urged forward. If it do not pass on, the lancets may be again used as before. After the stricture is divided, the armed catheter should be withdrawn, and its place supplied by one of elastic gum of the same size. This should remain for a day or two, to prevent the re-union of the divided parts, and to preclude the possibility of extravasation of urine; and on its removal, a bougie should be passed twice in the week, or as often as may be judged necessary, for some time; and the same treatment adopted as for stricture in general. The armed stilette intended to divide permeable strictures must be used precisely in the same manner as the other, of course excepting the wire, which cannot be introduced, and the same directions for the after-treatment are necessary for both." P. 69–74.

The principle and object of this mode of operation must be allowed to be good; for, in point of fact, it is merely accomplishing at once by a clean incision, what the bougie or the metallic staff is often forced to do at several times by laceration and contusion. A patient with stricture, after becoming tired of the ordinary slow process by mere gradual dilatation, applies to a surgeon who has got some reputation for the cure of this disease. A metallic sound of good size, generally some degrees larger than that which was previously inserted, is introduced, and, though manifestly too large for the contracted part, is thrust onward with immense pain and suffering to the patient, who protests *multum gemens*, that it is utterly impossible for the urethra to admit so large an instrument. The instrument, however, is introduced, and after remaining some time with much irritation is removed. A good deal of hemorrhage follows, and alarms the patient, who is nevertheless assured, that it is excellent for the stricture to bleed freely; that it is much inflamed; and that the most effectual mode of removing this is the free discharge of blood from the part. The bleeding at length subsides, and is followed by a good deal of pain and rawness always in the site of the stricture, not unfrequently along the whole canal. In the course of a day or two suppuration of the lacerated parts takes place; and the patient is again astonished by an increase of the discharge with which his disease was all along accompanied. The instrument is again introduced, and certainly enters with more facility, though with a good deal of pain still to the unfortunate patient. As suppuration advances, occasionally with ulceration, the morbid parts which were so perfectly lacerated begin to assume the state of a fistulous surface. Their excessive sensibility diminishes as the instrument continues to be used; but though the patient makes water more freely than before his stricture was thus forcibly lacerated, the new surface which is formed is rough, vascular, and irregular with granulations, and any thing but a healthy mucous membrane. It is impossible to doubt, that, if the stricture must be thus divided, it is much better to perform the operation by one clean incision by a cutting instrument, than by several or even only one lacerated wound. It is also clear, that, if benefit is to result from the hemorrhage, this must be more unmixed with the disadvantages of laceration, when incision only is employed.

The method now proposed is not free from objection. It is necessarily followed by some little inflammation; it is also attended by hemorrhage; and it is certainly possible that a false passage may be formed. These objections are nugatory, we conceive, and Mr Stafford does his best to answer them, though not so strongly as we think he might do. No operation, it may be remarked, is free from inflammation or hemorrhage; and the choice of the surgeon is between those which are attended by least of these effects. The inflammation must be more trifling in this operation than in the forcible use of the metallic staff; and if it becomes troublesome it may always be opposed by the usual general and local antiphlogistic measures. The hemorrhage may certainly be greater from an incised than a lacerated wound; but, as the best surgeons admit that it is beneficial, in what circumstances can it be more favourable to the stricture than the present? On this point, however, the mind of the surgeon may be at ease. In the cases in which Mr Stafford has operated, the hemorrhage, he assures us, has been inconsiderable, and the pain trifling.

On the subject of false passage, Mr Stafford shall be allowed to speak for himself.

"It may be objected to the use of these instruments, that there is a liability of making by them a false passage. This is prevented in the permeable stricture, by the wire acting as a director, and limiting the incisions to the size of the natural canal, so that it is impossible to deviate from the course of the urethra. With regard to the second case, or when the stricture is not permeable, it must be admitted that, in unskilful hands, or by violent means, a false passage may be formed; but that with common care this is not likely to occur is proved by the result of not less than twelve cases of impermeable stricture, where I myself have used the armed stilette or have seen it employed. In no case was there any false passage made. I very much question, however, if the same number of cases had been treated by caustic, whether they would have been attended by the same success. On the whole, therefore, it may be safely inferred, that although it is possible that a false passage may be made by the single lancetted stilette, yet with common care it may be avoided." Pp. 75, 76.

Here Mr Stafford is perfectly right. The truth is, that no instrument whatever is free from the objection of making a false passage, because no instrument can be constructed with eyes, delicate tact, and intelligence; and though it is always desirable to operate with the instrument least likely to go astray, while a very excellent instrument may do infinite mischief in hands which do not know its mode of procedure, a very ordinary instrument can be made to perform with great accuracy, when guided by intelligence, caution, and dexterity. The instrument is nothing but brute matter, and can do nothing of itself. It is the anatomical knowledge, the practical skill, and the delicate hand of the individual who guides it, that must prevent improper directions and the formation of false passages. But even Mr Stafford fails to make his case so strong as it might be, by ascribing to methods of treatment effects which are the natural consequence of the disease. The false passages and fistulous openings which occasionally take place in stricture are by no means always the result either of the caustic or of any other mode of treatment. Ulceration and laceration of the urethral membrane is a common consequence of stricture unremoved or neglected ; and when this is once begun, it in no long time terminates in a fistulous passage. The proof of this is, that these openings take place in cases in which no caustic has been used,—a circumstance which we have witnessed more than once, nay, many times, among the lower orders, and which must doubtless have occurred to the observation of Mr Stafford. It is almost frivolous, then, to talk of false passages from modes of treatment. The treatment must be execrable indeed, and the surgeon deplorably ignorant, or awkward, or negligent, or rash, who can be the instrument of perpetrating such atrocity.

In his subsequent and more extended experience, Mr Stafford has been enabled to speak with still greater confidence of the advantages of his method of operating, and to obviate still more completely the objections by which it is liable to be opposed. The following statement in the " Further Observations," is highly satisfactory.

> " With regard to the safety of the operation,—a subject on which I am aware there exists much prejudice and doubt, even among some of the most eminent and liberal surgeons, I can only say, that I have operated more than twenty times, without the slightest dangerous symptom occurring at the time, or afterwards ; —that I have divided strictures in the urethra in almost every part of its course, at distances of one, three, four, five, and six inches from the orifice, at the point immediately behind the bulb, and throughout the whole membranous portion ;—that some of these strictures have been half an inch, others an inch, and, in one case, two inches in length ; that I operated at one time on four strictures in the same urethra, varying from one-fourth of an inch to above an inch in extent ; and that in no instance was there a symptom to occasion the slightest alarm. The small quantity of blood lost from the operation was surprising, only in one case amounting to a table-spoonful, and usually not exceeding a few drops, or a tea-spoonful. This fact is so extraordinary, that, unless there had been repeated proofs, it would hardly be credited. The inflammation which has occurred has never been very great ; and, when it has taken place, I am much inclined to attribute it to

the irritation excited by the catheter having been left in the bladder. I am the more confirmed in this opinion from the fact, that in the only case in which I omitted its introduction, no sensible inflammation followed.

"The superiority of the division by the lancetted stilettes over the only plan of treatment which can be brought in competition with it—that by the caustic—is evident from the following circumstances. The pain is much less. This was admitted by every patient who had experienced both plans of treatment. In truth it is so little as, by their own confession, to be not worth mentioning. As a proof of this, all my patients stood during the operation, which did not usually occupy a longer time than a period varying from one to two minutes. The bleeding is not so great as what often attends the passage of a common bougie, consequently very much less than that after the application of caustic, in which the loss of half a pint, or a point of blood, is no uncommon occurrence. The formation of a false passage, which, in the most experienced hands, will inevitably sometimes occur from the use of caustic bougies, has never resulted in any case where I have employed the instruments. The last, and perhaps principal proof of superiority, however, of this plan of treatment, is the shortness of time occupied, and the rapidity of the cure. The length of time necessary for the common method, of course varies indefinitely:—three months may be stated a short period; and it often extends to one or two years, with a great chance of the recurrence of the disease in a more aggravated form. On the contrary, the longest time which it has been found necessary to pass a bougie after dividing the stricture with the lancetted stilette, has never exceeded six weeks; and in those cases it was passed merely to satisfy myself and the patient of the non-existence of the disease. Usually a large-sized bougie has been introduced almost immediately after the operation; and the cases have not required attendance more than three weeks or a month."—Further Observations, pp. 8—11.

The principle and object of the operation, and even the general mode of performance must therefore be admitted to be good. There is one objection, however, which Mr Stafford does not notice, and which it is not natural he should notice, and that is in the construction of the instrument. In the business of first carrying the small catheter through the stricture, and the withdrawing it and leaving the wire stilette, there is a degree of complexity and even difficulty, which must give much pain to the patient. It appears to be more practicable, and not less safe, to introduce a catheter or tube down to the stricture after ascertaining its exact distance, and through that to introduce the lancetted stilette of such a curvature as to divide the stricture in the axis of the urethra for a definite and exact space. This, in short, is the method for impermeable stricture; and we suspect, if ever the practice comes into general use, that this will be found in the majority of cases sufficient. It is clear that such a stilette cannot for the short space which it is urged beyond the catheter or tube deviate much from the urethral axis; for this must be prevented by the rigidity of the sides of the tube, and the curvature which it has already received. On this point, however, we shall not dwell, in the hope that the ingenious author of this contrivance, or some other surgeon who has occasion to use it much, may eventually devise such improvements in its construction, as shall at once simplify and facilitate the mode of operation.

To reconcile our surgical readers and their patients also to this mode of treatment, for these observations are perused we know by the latter as well as the former, we subjoin the account of the effects which it produces on the part, as they are described in the words of the author. The most important fact is the absorption or disappearance of the hard ligamentous substance forming the stricture.

"In cases where strictures have existed for ten or twenty years and upwards, on which I have operated, it appears that the hardened stricture by which the contraction was formed, became completely absorbed; and that the urethra at the part was restored apparently to its healthy condition. In no instance where the stricture has been divided have I had an opportunity of examing the part, (that is after death we imagine;) but if I may be allowed to reason from passing the catheter or bougie at different periods after the operation, (in some of them more than a year,) I may fairly come to the above conclusion. In none of these was there left the slightest hardness at the diseased part; indeed, in many of the patients it would have been difficult to have said where the contraction existed. It is probable that the division of the thickened and indurated substance produces ulceration of the diseased structure, at least where the incision of the part takes place, and that in this manner it is destroyed. This, I am led to infer, from having observed, that in some cases, if the stricture be only punctured, without being completely divided, on the following day a catheter can be passed. This circumstance happened in one or two cases where Mr Earle employed the instrument for impermeable strictures; and in these there was a slight discharge of pus from the urethra before a catheter was passed, which seems to prove this fact. This may not, however, be the only reason why the thickening and induration disappear from its division: it may be accounted for perhaps on another principle. It is reasonable to conclude, that when a canal which is naturally open, has become straightened at one particular point, by relieving this straightened part, great irritation must be removed; consequently the lymph which had been deposited between the interstices of the contracted portion, and which had materially assisted to form the induration, may possibly become absorbed, and the part be restored to its natural character. What seems more particularly to illustrate this point is, that sometimes the orifice of the urethra becomes nearly closed, and excessively indurated. In a few cases where I divided this species of contraction, I found the hardness entirely to subside. The uncured part has ulcerated and secreted pus; but the dense stricture around it has gradually softened until it has totally disappeared. It is not only in the urethra that I have remarked that the division of an indurated stricture will cause its absorption. In one instance, where Mr Lawrence operated for the stone, there was an extremely enlarged and hardened prostate gland, so hard that it resembled the structure of gristle; and this some time after the operation became of its natural size and structure. In a case also, where Mr Titus Berry divided a hardened contraction of the œsophagus by the armed stilette, the part was restored to its natural character. It is almost impossible to say by what this process is effected. It is nevertheless a very valuable fact, and one which is well worthy the notice of the profession." Pp. 77—80.

Since the publication of the volume which contains this extract, Mr Stafford has had an opportunity of inspecting the parts a considerable time after operation on the dead subject; and the appearances were so satisfactory, that the safety and the efficacy of the method of operating may be regarded as established.

" Lastly, in evidence of the completeness of the cure, I have a preparation of the urethra of a patient. His stricture, which was one of twenty-three years standing, and more than an inch in extent, was situated at the bulb, and in the membranous portion. The operation was completely successful, and he made water naturally. He lived nearly two years without any symptoms of stricture, and died, æt. 76, from diseased lungs, and the infirmities of old age. On examination, the calibre of the canal was found natural throughout; there was no hardness round the part that had been formerly contracted, and the membrane lining it was continuous with the rest of the urethra. The only difference that could be perceived was a little redness and roughness, and the incisions made by the instrument could be traced, though not very distinctly."—Further Observations, Pp. 12, 13.

The probability is, that the efficacy of the division depends chiefly on relaxing the mechanical tension of the strictured portion. When this has been effected, the vessels of the part begin a new and more healthy action; and absorption, or rather the cessation of deposition, is the result.

Upon the whole, it is impossible to avoid entertaining a high opinion of the utility of this method of attempting the permanent removal of bad and inveterate strictures. We do not think it is requisite in every case, nay, not even in the majority of cases. But in those of the description to which we have attempted to restrict its use, it promises to afford a degree of effectual relief, which cannot be expected from any other remedy in the hands of the surgeon. We believe, therefore, it is almost superfluous to express the hope that it will receive the serious attention of the surgical practitioner. This we doubt not it will obtain. It must be opposed neither by prejudice nor by indolence, but subjected to those fair and candid trials which alone can establish its actual merits. The cases which Mr Stafford has already published, and the trials which have been made by several of his friends are satisfactory, so far as they go; and they ought to have the effect of inducing other surgeons to have recourse to this method of relieving the urgent and continued distress resulting from obstinate stricture.

One remark only on an application of this mode of operating, not mentioned by the author, we shall make before concluding. There are certain obstinate forms of suppression resulting from enlargement of the third or middle lobe of the prostate gland, in which the introduction of the silver catheter is almost invariably impracticable. True it is, the elastic gum catheter can generally be made in the hands of one accustomed to its use to enter the bladder. But even this is not always to be depended on; and in some instances it is impracticable, after all the usual auxiliaries have been attempted. Then comes puncture of the bladder, or the alternative, fatal suppression and urinary coma. In such circumstances, it has been proposed to push the silver catheter straight forward through the gland into the bladder, rather than allow the patient to die unrelieved; and this was actually done, if we forget not, by Desault, perhaps by many others less capable; for it is an operation which no good surgeon would wish to perform. Now if this mode of perforation, for it cannot be called any thing else, be requisite, why should it be performed by a catheter,—a blunt instrument which must lacerate and tear up the parts through which it passes? Why not convert the operation into a puncture by a cutting instrument? It is clear that the hemorrhage is a secondary fear; and it is further clear that hemorrhage by a clean incision from the prostate and neck of the bladder, instead of being injurious, is the very means of all others likely to eradicate the disease at once and for ever.

Let the surgeon, therefore, never think of pushing his catheter in such circumstances through the swelled prostate. Let him introduce to the beginning of the prostatic obstruction a silver tube capable of allowing a pointed stilette to be inserted through it. Let this then be introduced and made to pass through the gland, in the axis of the urethra of course, and through the prostatic portion if possible; and let an incised puncture be made sufficiently large to admit the catheter or tube already in the urethra into the bladder, and to evacuate the urine. For this operation, the single lancetted stilette of Mr Stafford might answer indifferently well. The injury done by this mode of operation is slight and easily repaired; and, as has been already said, it is much more likely than any other means to relieve the disease effectually, and contribute to the permanent reduction of the enlarged prostate.

ART. V.—*A Treatise on Obstructed and Inflamed Hernia, and on Mechanical Obstructions of the Bowels internally; and also an Appendix containing a Brief Statement of the cause of difference in size in the Male and Female Bladder.* By HENRY STEPHENS, Member of the Royal College of Surgeons. London, 1829. 8vo. Pp. 191.

IT has been generally, nay universally, taught by the best surgical authorities, that the sole cause of the fatal termination of hernia consists in strangulation of the protruded bowel; and consequently that if the strangulation is effectually relieved,—if the stricture is divided or relaxed and the bowel replaced, the fatal termination of the disorder, so far as constriction or strangulation is concerned, is certainly averted. That this view of the cause of the disorder is correct, is to be inferred from the ordinary run of cases of hernia, the majority of which, so far as surgical experience hitherto goes, really consist in strangulation or constriction of the whole or part of the circumference of the bowel, and in which relief has been in general effectual in proportion to the success with which the cause of constriction has been removed.

There is, however, a class of cases of hernia in which the fact of strangulation has by no means been always clearly established; and in which, when established upon its efficient and thorough removal, the symptoms have not been relieved, nor has the fatal termination been averted. These cases surgeons have attempted to explain in different modes. Some have ascribed the persistence of the symptoms to general abdominal inflammation; some have imputed them to the circumstance of the operation being too late to arrest the secondary inflammation of the bowel and its effects; by some they have been ascribed to ileus, and by others to internal hernia; and by others to complications which mere operation is inadequate to remove.

Neither of these explanations is, according to the present author, the true one. The sole cause of the symptoms is obstruction occasioned either by adhesions of the protruded intestine preventing its free peristaltic motion, or by inflammation attacking it and producing similar effects. To this conclusion Mr Stephens has been led by the circumstances of several cases of hernia terminating fatally, yet without strangulation being cognizable after death; and his object in the present work is to distinguish this variety of fatal hernia from the others, and to show that it requires operation, but operation conducted on a different principle, and somewhat modified from that performed in ordinary cases of strangulated hernia.

The first inference, that hernia may prove fatal by obstruction resulting from adhesion, he begins to illustrate by the history of a case of ventral hernia terminating favourably, of which the following are the leading circumstances. In September 1824, the assistance of Mr Stephens was requested for a woman labouring under sickness, occasional vomiting, pain of the bowels, and eventually constipation, which did not yield to efficient purgatives. The latter circumstance suggested of course the idea of rupture; and upon examination, a ventral hernia with an old cicatrix on its surface, the effect of some ulceration, was recognized on the left side of the navel. It was easily reducible, however, and not strangulated; and Mr Stephens inferred that the symptoms did not depend on that, and that operation would be unserviceable. The patient continued to deteriorate, became extremely feeble, had frequent hiccup, fæcal vomiting, and all the usual symptoms of ileus or rather obstruction, which Mr Stephens thought highly probable existed in that portion of bowel contained in the hernial tumour. Operation was now proposed and rejected; and it was only on the evening of the following day, when the woman was believed to be dying, that a reluctant assent was given.

> "I divided the integuments, which were very thin, by a crucial incision, and afterwards a superficial fascia, with some cellular structure; the hernial sac was now exposed and opened freely, when I found a portion of the small intestine within, which was irreducible, another portion being loose, and readily passing into the abdomen when pressed. The small irreducible intestine was adhering very firmly to the hernial sac, and in a position which at once accounted for the symptoms I had observed; it was so closely united by adhesions to the hernial sac as to obstruct to all appearance its peristaltic action, and prevent the due course of its contents. There was no stricture, for I passed my finger very easily into the abdomen by the side of the intestine, which was somewhat discoloured. I relieved the bowel from its adhesions to the hernial sac, partly by the knife, and partly by the finger, with the assistance of my friends, and pushed the intestine into the abdomen, passing my finger in and around the opening in the inside to be satisfied that there was no further adhesion."

After this the vomiting ceased, the bowels were opened, and the patient at length recovered. From the result of this case, Mr Stephens concluded that hernia may prove fatal from other causes than strangulation; that the rule, not to operate unless strangulation is certain, admits of exception; and that simple adhesion of the hernia to the sac may produce symptoms which, though less rapidly, are not less surely fatal than those occasioned by strangulation. The latter, he remarks, may destroy life in some cases in twenty-four hours, and generally in four or five days; in the above case a week and two days elapsed after Mr Stephens began to attend, and the symptoms had existed three days previously.

In further confirmation of these views, Mr Stephens mentions a case of hernia in a public hospital supposed from the symptoms to be strangulated, but in which upon operation no stricture being found, the surgeon punctured the bowel to allow the escape of air,—with fatal consequence to the patient; and after some observations on the prohibition by Mr Pott of operating in umbilical hernia, he gives the following explanation of the cause of the persistence of the symptoms when the bowel is not strangulated.

> "The disorders in the intestinal canal are produced by the adhesions which take place of the hernia to the sac, &c. which have the effect of rendering the peristaltic motion, and passage of the ingesta, &c. through that portion of the tube confined, difficult, and painful. Thus umbilical and ventral hernia are well known to produce complaints of the stomach, habitual colics, especially after meals. This difficulty in the performance of this important function goes on increasing with the increase of adhesions, until at length it amounts to total obstruction, producing death, though with symptoms less violent, and considerably more protracted than in strangulated hernia. One is a simple obstruction of the function and passage of the bowels; the other is a constriction or strangulation of the part, ending, if not relieved, in sphacelus, which I believe in the former case rarely occurs. Sometimes this state of adhesion terminates in direct inflammation of the parts, which I shall hereafter describe under the head of inflamed hernia."

As a more direct and conclusive proof of the justice of the explanation here given, Mr Stephens relates the circumstances of a case of umbilico-ventral hernia which proceeded to the fatal event, yet in which dissection showed that neither stricture nor strangulation had taken place. After dividing the parts (somewhat below the navel) to a considerable depth through cellular membrane and fat, there was found the sac of a hernia, upon opening which was seen a circumscribed cavity containing a small loop of intestine. From this cavity a canal communicated obliquely with the umbilicus, and thence with the abdomen; and the portion of intestine had been thrust first partially through the navel, and thence into this blind sinuous canal, in the cavity of which it had undergone not strangulation, according to the author, but obstruction, that is, its peristaltic motion had been interrupted.

"Here then," he continues, "was a hernia, which had caused death without any stricture or strangulation. The portion of bowel which had escaped the umbilicus, and insinuated itself obliquely under the fat and integuments, was closely adhering to the sac, and doubled upon itself, so as effectually to obstruct its peristaltic action, and the passage of its contents. After we had satisfied ourselves that no stricture existed, and that the cause of death was simply mechanical obstruction, we separated the bowel from the strong adhesions by which it was held, and passed it readily into the abdomen. We then opened the abdomen and examined the intestine, and found that portion of intestine which we had just returned of a dark colour, but not in the least gangrenous. The intestinal canal leading from this portion was discoloured for three or four inches, but much less so than the part itself; the bowels generally exhibited no marks of inflammation, nor did the peritonæum. My colleague was now, as well as myself, perfectly satisfied that if the patient and her friends had consented to an operation the day previously her life might have been saved, and also that death from adhesions of the bowels in hernia may take place as surely as from strangulation." P. 18, 19.

Though we give the foregoing statement in the words of the author, we doubt whether every one would here agree with him as to the absence of strangulation. It is, we have all along conceived, an erroneous notion to imagine that strangulation implies the presence of a stricture. The bowel protruded into the cavity or canal forming the hernia is doubtless thrust into a more confined space than is compatible with its ordinary functions of peristaltic movement and propulsion of its contents; but it is not actually constricted as if by a tight ligature. In short, the textures composing the cavities or canals into which hernial tumours are protruded, are, with one or two exceptions at the most, totally inert and devoid of contractile powers; and the mischief, whatever be its nature, is effected not by their becoming smaller or more contracted, but by the protruded intestine becoming larger in consequence of its contents being attempted to be increased by the action of the portion of intestine above. We feel incompetent to say whether this was the case with the instance recorded by Mr Stephens; because on that point we conceive no one can justly give an opinion who has not inspected the parts with his own eyes, and examined them with his own hands. But we have several times seen instances of hernia, in which the presence of the symptoms usually ascribed to strangulation suggested the necessity of operating; yet when the incisions were made nothing like constriction was observed, and the parts retired, almost without an effort, the moment the sac was freely opened. The bowel, however, presented the usual dark colour attributed to strangulation; and little doubt could be entertained that it had suffered from being confined in a place too small to allow its free peristaltic motion, and perhaps its healthy vascular circulation.

Let indeed but a small portion of intestine be impelled by any accidental cause, no matter what, into a cavity sufficiently large at the time of impulsion to admit it; and it is easy to see, from considering the processes incessantly going on in the intestinal canal, that the cavity which at first receives it with facility, will very soon become too small to contain it, and much too limited to admit its natural motions. The portion impelled according to the supposition, contains at the moment solid, fluid, and gaseous contents; and these, by virtue of the peristaltic motion, are propelled forward to be received by the portion of bowel not protruded. When they reach the part at which the protruded joins the unprotruded portion, the former is so constrained that the contents cannot be made to pass with facility. At the same time, the unprotruded portion above is propelling its contents into the protruded and confined portion, which admits them so long as it may, but very soon becomes unable to do so, partly from distension, partly from the immoveable situation of its upper and lower extremities, and partly, as Scarpa observes, from the acuteness of the angle which the protruded forms with the unprotruded portion of intestine. In this manner the longer a portion of intestine remains protruded into any space or cavity, originally not very small, the larger it becomes, and the more unable to emancipate itself. In some instances even a small portion of the antimesenteric side of the bowel may be pushed into a hole or crevice, and merely in consequence of containing gaseous and fluid contents which are not readily expelled from it, it may remain there till it gives rise to all the symptoms of strangulated hernia.

The principal desideratum in the hypothesis of the author of the present treatise is, whether adhesions are absolutely necessary to the production of the effect? Are adhesions found in every case in which the symptoms of obstruction continue obstinately to the last? Are there no cases in which, without adhesions and without constriction, like that of a tight ligature, the symptoms have been observed, if not to proceed to the fatal event, at least to be quite those of strangulation? In inguinal and crural hernia we believe there is no doubt of the latter fact having been observed; at least, if we are not mistaken, we believe we have been so unfortunate as to witness this result, and we imagine that most persons conversant with surgical cases have had occasion to witness similar catastrophes. In the case of large herniæ again, such as those of umbilical and ventral, or ventro-inguinal, adhesions as a cause of obstruction are more likely to exist.

Upon the intractable nature of umbilical hernia, accordingly, Mr Stafford places the principal strength of his theory. In this form of the disease, he remarks, operations are less generally successful than in the other varieties, both because they are larger and older, and have generally undergone, by repeated inflammation, such changes of structure, and have contracted such adhesions to neighbouring parts, as render them incapable of restoration so easily as more recent and smaller protrusions. Upon this principle, he explains the rule delivered by some operators not to return the parts when the stricture is divided; and he maintains that the unknown disease with which they imagine umbilical hernia to be connected, is nothing else but the adhesions which the bowels have contracted to the surrounding parts.

Not satisfied, however, with this partial application of his hypothesis, he proceeds to show that the unfavourable results, not always easily explained, observed in inguinal and crural hernia, even when treated by operation, are to be ascribed to the same cause. With this view he quotes at some length a case of inguinal hernia operated on by Mr Earle at St Bartholomews,—one of femoral hernia operated on by Mr Tyrrel at St Thomas's Hospital,—one of inguinal by Mr Lawrence at St Bartholomews,—and three from the work of Sir Astley Cooper, lately re-edited by Mr Key. These it is unnecessary to examine at length. The author, it must be conceded, argues his point with much ingenuity and some force of reasoning; and he certainly directs the attention of the surgeon to some points which merit the most serious regard in a practical point of view. We must not forget to say, that Mr Stephens does not contend for the sole and exclusive operation of adhesion or obstruction from adhesion, as the cause of the fatal symptoms in all cases. The two cases which he describes, and the others which he adduces, he admits, are much less frequent in actual occurrence than to justify this inference. The most frequent forms of the disease, he thinks, consist of a combination of obstruction, that is, adhesion, and strangulation; and it is often difficult to determine in actual practice how much of each cause contributes to the unfavourable result.

The maintenance of the second proposition of the theory of Mr Stephens, viz. that hernial protrusions sometimes prove fatal by inflammation spontaneously established, totally independent of strangulation, is a point less difficult to establish, and which consequently is less zealously argued by the author. It is indeed a point which no one that knows any thing of the pathology of hernia would think of denying, and which it is almost idle seriously to demonstrate. Every instance of hernia is exposed to the general causes of inflammation, affecting the peritonæum, the intestinal mucous membrane, and the intestinal tissues generally; and every instance of hernia is moreover exposed to peculiar causes of inflammation, in so far as it is very frequently protruded from the general abdominal cavity, and undergoes more or less mechanical violence, either during this displacement, or in the necessary efforts made to reduce it. These casual attacks of inflammation, accompanied occasionally with much distension and other forms of mechanical violence, have a tendency to change the structure of the protruded part, and consequently to lay the foundation of chronic inflammatory action; and how much more liable textures, so changed, are to attacks of acute inflammation, it is unnecessary to explain in this place. These facts have been noticed by all authors on this subject, from Arnaud, and Richter, to Scarpa, Cooper, Thomson, and Lawrence. The sentiments of Mr Stephens on this topic may be understood from the following extract.

" Although large irreducible ruptures are those in which disease and inflammation, independent of mere mechanical obstruction, are most likely to arise, yet small irreducible ruptures are also very subject to this form of complaint, particularly omental, or those in which the omentum is contained. The omentum is subject in its unnatural situation to become thickened and diseased, and to suppurate *. The hernial sac will also often inflame and suppurate. The *appendiculæ epiploicæ* of the colon will also occasionally undergo some alteration of structure, when confined within a hernial sac. All these various changes and states of disease become a frequent source of inflammation to the contiguous bowels or peritonæum. The inflammation which is thus produced is attended by an obstinate obstruction, and symptoms of general inflammation throughout the abdomen, and is generally fatal in its consequences. When these herniæ are small, the inflammation of the rupture denoted by pain, soreness, and tension of the part, so clearly precedes the inflammation of the abdomen, that the case is usually mistaken for strangulated hernia; and if an operation is performed, the tension which the parts have acquired fills up the opening through which they have descended, and favours the mistaken opinion of the existence of a stricture. When the herniæ are large, the inflammation of the abdomen and of the herniæ are often nearly simultaneous, and if, upon operating, there is found a palpable absence of stricture, then the hernia is supposed to be merely participating in a general inflammation of the intestines. The want of success attending operations upon large herniæ, particularly umbilical, is attributed to the direct exposure of the peritoneal cavity, by which a dangerous inflammation is excited. I believe that the inflammation which destroys the patient is in the majority of cases altogether established before any operation is attempted."

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* " In old irreducible herniæ the omentum often becomes diseased."—Sir Astley Cooper, p. 27, p. i.

The principles thus laid down, the author proceeds to apply to the explanation of certain cases of hernia which had proved fatal, notwithstanding operation, and in which after death the hernial protrusions or their appendages were found more or less inflamed, or presenting the effects of inflammation. In the course of this discussion the author shows much ingenuity and no inconsiderable knowledge of the subject, in explaining differently from Sir Astley Cooper and Mr Lawrence, one or two unfavourable cases recorded by these authors. The general results of his inquiries may be understood from the following passages.

" Large irreducible herniæ, particularly umbilical, as I have before observed, are those which are most subject to this disease, and such cases confuse, and perplex very much, the mind of the medical attendant. Consisting, as they do, of very large portions of the abdominal contents, when they become inflamed, the whole abdomen is soon in active disorder; generally too, from the extensive adhesions which these herniæ have formed, obstruction is among the earliest symptoms. The character which the disease assumes, is that of peritoneal and general abdominal inflammation, they do not forcibly impress the medical man with any particular belief of their depending upon the herniæ, because the symptoms are not clearly those of strangulation; yet he has a vague suspicion that the disorder is somehow or other connected with it. Dissection shows a very extensive inflammation of the intestines, &c. and more especially among the contents of the hernia. The supposition which is often made upon these cases is, that inflammation of the intestines took place from some cause purely accidental, and which might have taken place if there had been no rupture. I wish to show that inflammations of this kind occur as a consequence of the adhesions and morbid conditions which the parts in a rupture acquire, and therefore that a hernia, besides the risk of its becoming strangulated, has other mischievous and fatal tendency." P. 82, 83.

Whatever truth be in these representations, it seems to be of little practical importance to distinguish the inflamed from strangulated hernia, since in both cases operation is requisite. In the former, indeed, it must be necessary to deplete generally, with the view of subduing the general abdominal disease; but this the judicious surgeon will not neglect in either case.

In both varieties of the disease operation is equally indicated; in the first to separate the adhesions; in the second to remove, if possible, the exciting cause of inflammation, and partly by locally depleting and returning the parts to obviate its effects.

In accomplishing the first of these objects, Mr Stephens, after the necessary incisions to expose the protruded bowel, proposes to separate the adhesions by the finger if possible; but if this require force, which must be the case in old cases, division by the knife must be performed. When the hernial sac is not diseased he recommends it to be returned, with the view, as subsequently appears, of favouring the accomplishment of the *radical cure*, by obliterating the preternatural opening through which the hernia is protruded. When omentum is contained within a hernial sac, if it has formed general adhesions it ought to be cut off, as in such a state it is likely, if returned, to become the seat of inflammation, and by subsequent adhesion to become the cause of further injury.

In accomplishing the second object, though Mr Stephens does not propose to neglect the usual depletory measures, he thinks these must be inefficient so long as the hernia, the cause of the inflammation, exists. Incisions, he properly enough argues, into a part already inflamed, cannot increase that inflammation; and it is clear that by mechanically relaxing the tension, and allowing a free exit to the products of inflammation, they must be advantageous.

In the case of large umbilical herniæ, irreducible from the bulk of the abdomen, he proposes the following method of operation.

> "I should make an incision through the integuments, and open the hernial sac, and proceed carefully to separate all important adhesions; and as the omentum is generally the most adherent part, and is the most frequent source of disease, I should cut it completely away. I should then pass my finger on the outside of the hernial sac into the abdomen, between the peritoneum and the parietes, and afterwards, by introducing a knife properly constructed, endeavour to cut through the linea alba in a direction downwards, so as to allow the abdominal parietes to separate, which I believe they would subsequently do to a considerable extent, from the constant pressure of the intestines. I should divide the linea alba only, and should avoid, if possible, carrying the incision through or into the integuments. I should expect by this means to gain sufficient abdominal space to pass back the contents of the hernia, and by securing them by properly constructed bandages within the abdomen at that part, a corresponding protrusion would probably take place below, if not directly, at least gradually. This protrusion taking place from a large opening, and forming to itself a large space outside the parietes, would not, I think, be so

subject to those adhesions, and consequences which occur in the more confined situation of umbilical hernia." Pp. 103, 104.

He subsequently proceeds to consider the question of the practicability and the expediency of what has been denominated the *radical cure* of irreducible adherent ruptures, not attended by strangulation. This, it is well known, consists in obliterating by operation the opening or canal, through which the rupture has taken place; and from the success with which an attempt of this kind was attended in a brute animal, Mr Stephens, like all enthusiasts, gives the proposal unqualified approbation. This experiment, which was performed on a favourite pointer bitch, consisted in exposing by suitable incisions an enormous hernia, ventro-inguinal, so far as the description enables us to judge, when he found that part of it was irreducible, and was firmly connected by adhesion to parts out of the abdomen, and incorporated also with the hernial sac. The sac he dexterously detached from the integuments, and returned it along with the bowel, mutually adhering as they were, into the abdomen. The wound, which was large, was united by the quilled suture. The operation was performed in August; and during the shooting-season of September and October, this valuable quadruped, or, as Mr Stephens denominates her, "his canine patient," was able "to perform her duties with alacrity and vigour."

"On calling upon her owner some time afterwards, the bitch was brought for my inspection. Upon inspecting the abdomen, I was at first disappointed in finding, what I thought a return of the hernia; but upon more close examination I was gratified in observing, that there was no return of the original rupture, but that a protrusion was taking place, at the other abdominal ring. This was peculiarly confirmatory of a complete radical cure having been effected. The animal had been kept by her owner in London, where she was closely confined, without exercise, and had become amazingly fat. The abdominal contents in this way becoming disproportionate to the size of the abdominal cavity, had forced their way through the opening in the parietes. In this way the first rupture was occasioned, and this second was taking place from the same cause. Had not the opening, through which the first hernia passed, been closed by the operation, the bowels must have again passed in this direction, but the opening of the first hernia was so completely shut by the adhesion of the sac, that the abdominal ring on the other side gave way to the pressure of the bowels, instead of the former aperture. This has proved, that the operation rendered the abdomen at that part more secure than it was originally formed. I have been exceedingly gratified by the results of this case, because it has completely demonstrated the possibility of radically curing hernia." Pp. 115, 116.

The case is conclusive as to the lower animals; but an equally strong case upon the human subject is requisite to demonstrate its practicability and efficacy in the human body. After all, it is rather, we conceive, a question of expediency than of absolute necessity; for we believe there are few persons, even with large irreducible herniæ, which give no manner of alarm or uneasiness unless from their cumbrous and unsightly aspect, who would choose to subject themselves to the surgeon's knife, to undergo an operation, which it is not always possible to persuade them is free from danger. Could the historian of the Decline and Fall have been prevailed upon to undergo this sort of disembowelling? or would it have been justifiable to place upon the turning of the numerous casualties, by which incisions into the cavities of the human subject may be attended, a valuable life which is not threatened by any immediate or urgent danger? Nor is this procedure in all instances requisite. For it may, and actually does, happen that a large and bulky hernia, which at one time, and in the hands of one person is irreducible, becomes by a little management and patient address reducible in the hands of another, and admits of the application of the truss. We know in this town a surgeon's instrument maker who has succeeded in reducing very large hernial tumours, which by competent judges had been declared to be incapable of reduction.

On mechanical obstructions of the bowels and the mode of distinguishing them from *enteritis*, from hernia, and similar disorders, the author enters into a disquisition, in which he labours to prove the possibility of distinguishing with certainty these diseases, and even the varieties of mechanical obstruction during life. Though Mr Stephens describes a case in which all the symptoms arose from a mass of cherry-stones firmly impacted in the rectum, and upon the removal of which they disappeared, we cannot perceive that he has given the surgeon either a diagnosis which will in all future cases prevent him from going wrong, or a method of treatment by which he may with certainty avert the fatal event. He admits the utility of blood-letting, but is averse to the unnecessary effusion of human blood in a disease in which there is so much sinking of the powers. Laxatives or aperient medicines he allows, but condemns drastic purgatives in unqualified terms, as augmenting inflammation, in moderating which, calomel he thinks may be useful, especially combined with opium. Liquid quicksilver also is prohibited; and the only measures which are allowed to be rational are copious injections of tepid water *per anum*, which by distending the lower part of the bowel he imagines may be useful in withdrawing it from its strangulated position. When there is reason to think that the obstruction depends on invagination, he further recommends the forcible injection of air into the rectum and colon by means of bellows, and thinks that injecting quicksilver in like manner may be more useful than if swallowed.

If these measures fail, he even seriously proposes to make an incision into the abdominal cavity, through the *linea alba* or *linea semilunaris*, in a situation near the part in which the obstruction is supposed to be, to draw out the bowels, and having ascertained the exact place of obstruction, to remove its cause, whether adhesion, strangulation, or intus-susception. In this operation, though he see difficulty, and some danger, he recognizes nothing desperate; and argues from the experiments of Dr Blundell, that it may be performed without bad effects. Inflammation, which is chiefly to be dreaded, if not obviated by the depletions in general previously practised, must be opposed by more extended forms of the remedy; but the chief attention is to be directed to restore the functions of the bowels by means of laxatives and calomel and opium. The procedure is bold; but it cannot be denounced as more impracticable or more wanton than some with which of late years the history of the art has been diversified; and the author naturally consoles himself by the following reflection.

> "If I succeed in persuading my professional brethren to attempt the relief of these cases by an operation, and success should follow in only a few instances, I shall have contributed my mite to the great cause of relieving suffering and saving life; as well as to the advancement and improvement of the profession to which I belong."

The appendix contains a statement of the cause of difference in size between the male and female bladder, which may be given in Mr Stephens's own words.

> "Anatomists and Physiologists have long known the fact that the human female bladder is larger than that of the male; and have accounted for it, by supposing that motives of delicacy, and the habits of society, not allowing females the same frequent opportunities of relieving themselves as are possessed by the other sex, the longer retention of urine causes the bladder to increase in size. This was the doctrine promulgated by the teachers of anatomy and midwifery, at the various schools of instruction in those branches of medical science, during the time I was a student and attendant upon their lectures; and as far as I can learn, this is the opinion still given by teachers of medical science, whenever they have occasion to advert to the subject; and so plausible does the

explanation appear, and so plainly does it seem to account for the fact, that the accuracy of this opinion seems never to have been questioned, or even enquired into.

"What will physiologists say in support of the above opinion, when they shall learn, that the bladder of the cow, of the ewe, of the sow, and, as far as I have investigated, of every other female animal of the class Mammalia is, under certain circumstances, larger than that of the male? Surely they will look for some other cause than the one usually assigned for this difference. Motives of delicacy cannot, I presume, be a prevailing cause with such animals as the cow and the sow." P. 187—189.

Though we admit that our habitual gravity was nearly subverted by this zootomical communication, which bore the air of some ill-timed pleasantry, after so much serious reasoning and meditation about cutting into the human belly, we cannot deny that it is consolatory to see referred to the great general head of sexual differences,—a fact which had been absurdly ascribed to the necessary usages and restraints of civilized society. It appears further, that the difference is not original, but depends on the animals, human or inferior, having produced young, in which, says Mr Stephens, the bladder is not only larger but thinner in its coats,—an additional proof that it is a subsequent dilatation and not an original formation. *Quære,* Cujusmodi sunt figura et magnitudo vesicæ in virgine vetula?

ART. VI.—*Elements of Medical Statistics; containing the substance of the Gulstonian Lectures delivered at the Royal College of Physicians: with numerous additions, illustrative of the comparative salubrity, longevity, mortality, and prevalence of diseases in the principal countries and cities of the civilized world.* By F. BISSET HAWKINS, M.D. of Exeter College, Oxford; Fellow of the Royal College of Physicians, and Physician to the Westminster General Dispensary. Longman, &c. London, 1829. Pp. 234. 8vo.

NOTWITHSTANDING the dubious authenticity and numerous defects of many of the documents which at present compose the materials of the science of medical statistics, Dr Hawkins conceives that the time has arrived when its scattered fragments may with advantage be collected and formed into a system. This task, which has not hitherto been attempted, and for the accomplishment of which no little zeal, patience, and learning are required, he has executed in a manner that cannot fail to attract the warm commendations of every admirer of medicostatistical inquiries. We have repeatedly had occasion to express regret that the followers of this science should frequently find their efforts to advance it thwarted by the poverty and inaccuracies of the numerical reports on which their reasoning is founded; and we have no doubt but Dr Hawkins must in his turn have been often baffled in his researches by that impediment. Yet the number of particular facts he has adduced in support of his general principles is so great, and the former commonly bear upon the latter in so pointed and unequivocal a manner, that his inferences must be for the most part removed beyond the reach of individual sources of error. It would be fruitless for us to attempt transferring to our pages for the reader's benefit the whole or even any material part of the substance of this work, as it already consists of a series of condensed numerical statements, and short general propositions, which almost defy farther abridgement. We shall therefore merely state the contents of the chapters, and extract one or two examples of the statistical results, which have struck us most by their novelty or importance.

After alluding in a few words in the first chapter to the utility of the science, and giving a short view of the history of its rise and progress, Dr Hawkins endeavours to ascertain approximatively the value of life or relative mortality in ancient and modern times, and he shows that, notwithstanding the imaginary advantages which many moderns in their admiration of antiquity believe to have been possessed by the early ages of Rome, the chance of life was at that time materially lower than in the most refined nations and cities of the present day. From this general statement he proceeds in chapter 2, to treat of the progressive improvement in the rate of mortality throughout Great Britain, a subject which is now familiar to every statistical student, but on which we shall nevertheless notice briefly the principal facts here brought together. In chapter 3, he endeavours to prove the superior salubrity of Britain over all other civilized countries, and by a series of interesting documents establishes incontestably the fact that Britain at present possesses this superiority in an eminent degree in consequence chiefly of the rapid improvement which has taken place in mortality during last century. In chapters 4 and 5, are compared the relative mortality of country districts and of cities of various sizes; and here too he takes occasion to illustrate from time to time the advantages enjoyed in Britain over various kingdoms of the Continent. The same flattering comparison is again drawn in chapter 6, which treats of the mortality of general hospitals at home and abroad, as also in chapter 7, which states the mortality of lying-in-hospitals and the relative proportion of still births,—

in the succeeding chapter, which enters on the subject of foundling hospitals, and the vast improvement which has taken place in modern times in infantile mortality,—and finally in the 9th chapter upon the statistics of lunatic asylums. Short mention is then made of the mortality of prisons; an interesting chapter follows on the relative prevalence of suicide in different periods and countries,—in which again, as is well known since the investigations of Dr Burrows, the balance still turns out to be in favour of Great Britain. Next in order come certain details on the comparative prevalence, increase, and decrease of disease in different countries and cities. The statistics of climate, in which an attempt is made to classify climates according to their effect on health and longevity, forms the subject of chapter 13. The influence of trade, profession, and mode of living on the mean duration of life and the average amount of disease is discussed in the 14th chapter. The 15th investigates the comparative mortality of the sexes and comparative fruitfulness of marriages in various countries. And in the concluding chapter the author applies his previous inquiries to illustrate the principle of population.

After this brief summary of the titles of the chapters, we shall commence our illustrations of their contents by a sketch of the information brought forward on the progressive improvement which has taken place during the lapse of ages in the chance of life.

According to *Domitius Ulpianus*, the mean term of life among the citizens of ancient Rome, as deduced from the registers kept by the censors for a thousand years previous to the time of Justinian, was *thirty years*. In Paris among the easy classes of society, corresponding as nearly as possible to the class of *citizens* in ancient Rome, the mean term is at present *forty-two years*, and in Britain Dr Hawkins infers from the inquiries of Mr Finlayson, it is so high as *fifty* years. The latter statement, however, probably overrates the mean term as compared with that of the Roman citizens; for we cannot agree with the author in considering that the " nominees of the tontines and other life-annuities," represent the same class of society, or the same denomination of lives as the general mass of the citizens of Rome, *excluding merely slaves*. The lives in Mr Finlayson's tables were certainly more select. Yet even with the correction thus rendered necessary, we apprehend a most essential superiority would after all be found in the mean term of modern life over that of antiquity. The most accurate documents on the improvement of the average duration of life in later centuries are those derived from the mortuary tables of Geneva, preserved since 1560. From these it appears that the mean term of life at the Reformation was *eighteen* years, in the 17th century *twenty-three*, in the 18th century *thirty-two*, and in the present thirty-six. In England, it appears from the select lives of the nominees under the Million Act, that in 1695 the mean terms for such lives was about thirty-seven years, and in 1789 fifty-two. In England and Wales the annual mortality was in 1780 one in forty, in 1790 one in forty-five, in 1801 one in forty-seven, in 1811 one in fifty-two, and in 1821 one in fifty-eight. A very extraordinary change has taken place in the average mortality of London even in so short a space of time as the last half century, during the very period in fact when the city was extending its limits, and increasing its population most rapidly : about the middle of last century the annual deaths were one in twenty, and in 1821 only one in forty.

This extraordinary improvement in mortality is to be traced in part to the extinction or diminished frequency of certain fatal diseases ; but it is likewise referrible to a decrease in the mortality from all diseases. There is not in fact a single establishment for the maintenance of the sick, which does not exhibit a progressive improvement in the proportional deaths. For example, if we take general hospitals, we find that from 1689 to 1741, the mortality in St Thomas's Hospital, London, was about one in ten ; while from 1773 to 1783 it was one in fourteen, during the next ten years one in fifteen, and in the ten years ending with 1813 it was only one in sixteen. In fever hospitals the mortality has decreased prodigiously even within the present century : At the fever hospital of London from 1804 to 1812 it was one in twelve, in 1815 it was one in twenty. In no institution, however, has the improvement been so astonishing as in lying-in hospitls. Since 1750, when the deaths in childbed at the British Lying-in hospital of London were one in forty-two, there has been a gradual diminution to one in sixty in 1780, and to one in two hundred and eighty-eight in 1798. In the Dublin hospital the deaths in 2675 deliveries in 1822 were one in two hundred and twenty-three. The mortality in foundling hospitals has also decreased in a very great proportion ; but Dr Hawkins has not given any pointed facts in illustration. It is very well known that till the most recent times the number of infants preserved by these institutions was inconceivably small. A striking instance, however, is stated by our author illustrative of their advantages when they are on a restricted footing as to the admission of inmates. In the foundling hospital of London, where at present 310 children are kept, besides 130 in the country, but which receives them only on special application, the mortality from the period of entrance till the age of fourteen has been for the twenty years ended in 1827, only twenty-five per cent. In further proof of the improved chance of life for children, Dr Hawkins dwells pretty fully on the well known decrease that has taken place in infantile mortality, and illustrates the fact by copious references to the work of Mr Roberton lately reviewed in this Journal.

With these data, and many others from among which we have selected them, Dr Hawkins proceeds to compare the late progress and actual state of various continental countries as to the annual average of mortality; and the result, as we have already hinted, is highly and unexpectedly flattering to our own country.

> "Since the late peace," says he, "the principal governments of Europe have paid much attention to statistics, and we possess very instructive returns from nearly all the countries, cities, and hospitals on the Continent. A comparison of these results enables us to submit a very interesting conclusion, and one which we are not aware to have been as yet generally received, namely, that the mortality of Great Britain, its cities, and its hospitals, is greatly inferior to that of any other country in Europe; and that it is incontestable that Great Britain is at present the most healthy country with which we are acquainted; and that it has been gradually tending to that point during the last fifty years. In the comparisons which we shall have occasion to make in order to support this assertion, we shall carefully abstain from reproducing the tables of remote periods, which have been often previously discussed, and shall be confined to the most recent and genuine details. It is remarkable that this superior value of life in Great Britain is not confined to any particular districts or classes of individuals. To whatever point we turn our view, the advantage is still the same: the man of affluence, the pauper patient of the hospital, the sailor and the soldier on active service, the prisoner of war, the inmate of a goal, all enjoy a better tenure of existence from this country than from any other of which we have been able to consult the records. It has been long the fashion, both abroad and at home, to exhaust every variety of reproach on the climate of our country, and particularly on the atmosphere of London; and yet we shall find that the most favoured spots in Europe, the places which have been long selected as the resort of invalids and the fountains of health, are far more fatal to life than even this great metropolis." P. 30.

Thus in France the improvement which has taken place in the annual mortality during the last forty years is decidedly great; yet at the present time the mortality is very far from being so low as in England. In 1781 it was one in twenty-nine, in 1802 one in thirty, and in 1823 it was one in forty; but this falls very much short of the improvement which we have already seen had taken place throughout England in 1821, the annual mortality being then only one in fifty-eight. In Sweden the annual deaths between 1755 and 1775 were one in thirty-five, during the next twenty years one in thirty-seven, in 1823 one in forty-eight. The Pays de Vaud is the country which approaches nearest to England in healthiness, the annual mortality being one in forty-nine. In Prussia and Naples the average is from one in thirty-three to one in thirty-five. In London the present annual mortality we have seen to be one in forty, in Glasgow it is one in forty-seven, in Manchester one in seventy-four; but in New-York it is one in forty, in Philadelphia one in thirty-four, in Berlin one in thirty-four, in Paris, Lyons, and Barcelona one in thirty-two, in Palermo thirty-one, in Madrid twenty-nine, in Rome twenty-five, in Amsterdam twenty-four, in Prague twenty-four and a-half, and in Vienna *one in twenty-two and a half!* In almost every point of view, so far as regards the objects of the science of medical statistics, Vienna, and indeed the whole Austrian dominions, occupy the lowest place in the scale of gradation. The average mortality throughout the United States of North America is one in forty, and in the healthiest provinces one in fifty-six. In New Spain it is much higher, the general average being one in thirty, and that of some districts one in twenty-six. In the Isle of Bourbon the mortality is less than in France, namely one in forty-five; among the free blacks only *one in sixty-two;* but among the black slaves so considerably greater, that, taken in conjunction with the small proportion of births, the slave population is decreasing at the rate of three per cent. annually, while, on the contrary, the white population, notwithstanding the comparative hostility of the climate, is increasing at the rate of one and two-thirds per cent. every year.

On proceeding to analyze the causes of mortality, we shall find the same advantage in favour of Britain throughout every department. For example, it may be distinctly made out that in all the general hospitals of her chief cities, there is an inferior mortality to that of similar hospitals in continental cities of the same magnitude. In Paris the mortality of the whole hospitals was in 1822 one in eight and a-half, in the Hotel-Dieu one in seven, in La Charité one in five. At Lyons the mortality is one in eleven, at Montpellier one in ten, while in Edinburgh it is one in sixteen. At Berlin from 1796 to 1817 the mortality of the general hospital was one in six. At Vienna in 1824 it was also one in six, and at Pesth in Hungary it was as high in 1825-6. At Dresden it was in 1816 one in seven, at Munich in 1819 one in nine, at Milan in 1823 one in seven, at Amsterdam in twenty years previous to 1820 one in eight, at Geneva in 1823 one in eleven, and in the Imperial Hospital for the sick poor at St Petersburgh *one in four and a-half.* As a point of comparison for the smallest of these towns we must add, that at Bath in 1827 it was only one in twenty.

An equal or even greater difference prevails as to the mortality of lying-in hospitals. This, which at London in 1780 was one in sixty, was at Paris about the same time one in fifteen; in the former in 1826 one in seventy, at the latter in 1822 one in thirty. In Stockholm in 1822 the deaths were one in twenty-nine, in Berlin from 1807 to 1817 one in forty-five.

There is also a great difference between London and Paris in the mortality of the Foundling-hospital; but the two institutions are not upon the same footing, as that of Paris receives every child without inquiry, nay without the parent being obliged to make herself known. There the mortality amounts nearly to one-half during the first year. This is also nearly the mortality in Vienna. In the Foundling-hospitals of Moscow and St Petersburgh the deaths in 1812 were exactly equal to one-half of the admissions. In towns of less size, such as Florence and Naples, the deaths were in general much less numerous, being only one in ten, and one in five; yet at Palermo they amount to seventy-two per cent.

In no department perhaps is there a greater difference than in the mortality of prisons. According to the late researches of Villermé, the deaths in the prisons of Paris from 1815 to 1818 were one in twenty-three; and according to Quetelet the mortality in the chief prisons of the Netherlands is one in twenty-seven. But in the Fleet prison of London, according to information communicated to our author by its surgeon, Mr S. Cooper, the deaths in 1828 were only one in seventy-five; and the average deaths for the Fleet and King's Bench prisons is from one in fifty to one in fifty-five.

Dr Hawkins likewise touches on the relative prevalence of suicide, in which particular, too, it is now generally acknowledged by continental writers, that Britain holds a high rank in relative immunity.

We wish we could add to the foregoing abstract of his remarks on the improvement which has taken place in the course of time upon the chance of life, and on the advantages possessed in this respect by our own country over foreign nations, a sketch of his chapter on the Comparative Prevalence, Increase and Decrease of diseases. But by doing so we should extend the present notice to a disproportionate length. We shall merely quote, therefore, the following interesting analysis which he has made of the tables drawn up by Mr Morgan from the documents of the Equitable Insurance Office.

"The number of individuals insured during that time (from

1800 to 1821) is stated by Mr Morgan to have been nearly 150,000. They were composed chiefly of the middle or easy classes, and of every age from ten upwards. Mr Morgan, who was formerly a member of the medical profession, considers this table as a fair estimate of the diseases of this country,—but, we must add, more especially of its middle classes. The certificates of the diseases were principally signed by medical men. We perceive that the total deaths were 1930. The greatest number of deaths under any one head is 262 for *natural decay and old age.* This is a remarkable feature, because it indicates that about a seventh part of the deaths were not apparently owing to disease. Apoplexy is next the most fatal agent; *consumption follows far behind.* General fever then presents itself. The principal diseases follow in this order,—dropsy, palsy;—hydrothorax makes a nineteenth of the whole, and its chief victims were between 50 and 60 years of age;—then diseases of the liver, inflammation of the bowels and of the lungs. The cases of calculous disorder were eight. There is not a single death from small-pox, measles, or scarlet fever. Angina pectoris presents a large proportion of forty-four. Gout affords twenty-six deaths. The deaths from accidents were nineteen.

" *The deaths from consumption are scarcely one in twelve,* which is very different from the usual proportion in the general population, and indicates in this particular, as in many others, the conservative power of affluence. But the fatality of consumption has begun to diminish also in regard to the general population of London. At the close of last century the deaths from this disease had gradually increased from about 15 per cent. to 26 per cent. of the total mortality. From 1799 to 1808 they still increased, being then above 27 per cent. From 1808 to 1818 they however declined to 23 per cent. and from 1818 to 1825 they have become still less numerous, being at length only 22 per cent. nearly the same proportion as at Paris. At Vienna it is about 17 per cent." P. 184.

We cannot conclude without acknowledging the pleasure we have received from the perusal of Dr Hawkins's work. He has chosen an arduous line of investigation for the exercise of his talents, but one in which assiduity will certainly be rewarded by many discoveries equally interesting to the medical profession and to the scientific in general. We heartily wish him success in his labours, and hope that the present essay will meet with such encouragement as will induce him soon to undertake the more detailed treatise of which the present is evidently the sketch.

Art. VII.—*Illustrations of the Diseases of the Breast.* By Sir Astley Cooper, Bart. F. R. S. Sergeant Surgeon to his Majesty ; Consulting Surgeon of Guy's Hospital ; Lecturer on Anatomy and Surgery, &c. &c. In Two Parts. Part I. London, 1829. 4to. Pp. 89. Nine Plates.

THIS is the first part of a work which cannot fail to be of the greatest utility to the surgeon in the exercise of his art, and the appearance of which, coming as it does from one whose opportunities enable him to communicate the results of long and extensive experience, will be welcomed by every one interested in the progress of the art of healing. Every practical surgeon knows how many different forms of morbid action, and how many varieties of new structure, are liable to be developed in the female breast ; and as he is ofttimes required to distinguish those which are harmless, from such as are malignant, and those which tend to destructive disorganization, from those which betray no such disposition, it becomes an object of the greatest practical importance to possess on their history and formation as accurate knowledge as the subject admits. If on such a subject the experience of any single individual can be useful, Sir Astley Cooper is certainly entitled to the distinction.

The diseases of the female breast Sir Astley divides into three classes ; 1*st*, those which are the result of common inflammation, whether acute or chronic ; 2*d*, those which arise from peculiar or specific action, but which have no malignant tendency, and do not contaminate other structures ; 3*d*, those which are not only founded on local, malignant, and specific actions, but which are connected with a peculiar and unhealthy state of the constitution.

The first of these classes comprehends acute inflammation of the organ, as in the case of milk abscess, or rather what we call mammary abscess ; and chronic inflammation, terminating either in indolent abscess, or in obstruction of one or more lactiferous tubes. In the second class are contained the following eight varieties of tumour, hydatid, chronic mammary tumour, ossific tumour, adipose tumour, large pendulous breast, scrofulous tumour, irritable breast and ecchymosis. The third contains the two malignant diseases, scirrhus, and fungous tubercle. The two first classes only are considered in the part of the work now before us.

Acute inflammation of the breast, the progress of which is accurately described, Sir Astley represents as principally caused by the violent impulse of blood to the organ each time the child is applied to the breast, as preparatory to the secretion of milk. This of course is to be understood as the disposing cause; for the author admits the influence of such exciting causes as exposure to cold, deferring putting the infant to the breast at the first, to remove the *colostrum*, and stimulating the mother by warm drinks.

In the treatment purging and the application of local refrigerants with occasional leeches are recommended, with the view of preventing suppuration. But if this appears to threaten, fomentations by means of poppy decoction or poultices locally, and opium internally, with the spirit of Mindererus or saline draughts, and small doses of Epsom salts, are stated to be more proper.

On the question of operating by incision or not, Sir Astley recommends the abscess to be allowed to open spontaneously, unless when it is deep-seated, its progress tedious, the local pain severe, and much symptomatic fever, with profuse perspiration and want of rest, when he admits that much time is saved, and the sufferings much diminished, by a free opening by the lancet. To prevent it from closing by adhesion and favouring the accumulation of matter, he recommends it to be made where the matter is nearest the surface, and the fluctuation distinct, and to be large in proportion to its depth. It will be found convenient, we may add, to insert into the wound a small slip of oiled charpie.

When sinuses are formed, it is recommended to inject them with a lotion of rose-water, containing 2 or 3 drops of sulphuric acid in the ounce, and apply the same by means of folds of linen over the breasts,—with the view of checking the secretion of matter and promoting the adhesion. When a deep-seated abscess or sinus denudes the ribs, as occasionally happens, and causes exfoliation, the same practice is recommended. Incision is prohibited as useless, unless where the exfoliating bone is actually loose, when it will facilitate its removal.

In the following case a more serious termination took place.

> "I once saw a lady of a very delicate constitution, and who suffered under very great anxiety of mind from her husband having been confined in prison for debt, who, after her lying-in, had a milk-abscess in her bosom, which broke and discharged large quantities of matter; and then, instead of healing, the whole breast became excessively swollen, and a truly fungoid excrescence appeared, by which disease she was soon destroyed."

For removing the consequent hardness, the application of the mercurial gum-ammoniac plaster, or friction with iodine ointment is recommended as most useful in promoting absorption.

The question of allowing the child to suck the diseased breast is decided in general according to the feelings of the mother. The breast should be drawn if not sucked; and if the nipple is involved in the disease, it should be drawn either by the mother herself, or by the lips of a nurse, to obviate the painful bruising caused by the pump.

The chronic abscess is important, chiefly in consequence of the facility with which it is liable to be confounded with disease requiring removal by operation. All that is requisite is evacuation of the matter by the lancet, the use of the poultice, and afterwards suitable dressings with stimulating injections, and such constitutional remedies as the compound calomel pill at night, and bark with soda, or compound infusion of gentian with soda and rhubarb during the day. The mercurial gum-ammoniac plaster, or a solution of muriate of ammonia with rectified spirit of wine, are recommended to dissipate induration and promote absorption.

In another variety of chronic inflammation, this process, by attacking or involving the lactiferous tubes, may obstruct the aperture and obliterate the cavity of any one of them for an inch or more. The result of this is an accumulation of milk in the tube above its obliterated part, a painful fluctuating swelling confined to one portion of the breast, from the nipple to the circumference of the organ, and much distension of whole breast, but especially of the cutaneous veins. A slight puncture discharges the milk; but if it immediately close, accumulation recommences, and the sufferings of the patient are renewed.

"The treatment which this case requires is as follows: If the mother be prevailed on to wean the child, as the secretion of milk will soon cease in this obstructed part as in other parts of the breast, simple puncture will suffice to relieve the distended tube of the milk which it contains."

"But if the child still continue at the breast, the opening may be made larger, and the milk be suffered to escape at the artificial aperture while the child is sucking; thus imitating the natural relief which the ulcerative process sometimes produces, until the secretion of milk ceases, from the weaning of the child, and from purges to the mother."

Weaning we do not regard as absolutely necessary in this case. Though obstruction of a lactiferous tube renders one breast unserviceable, the other is still left; and if the child is in good season put to this, milk will be secreted in sufficient quantity for the purposes of nursing.

Under the second class of diseases of the breast, the *hydatid tumour* first receives attention. Of this Sir Astley distinguishes four species, of which one only is malignant.

Of the former, the first species assumes the form of bags containing a serous fluid. Appearing at first like a solid tumour, it enlarges slowly without pain for months or years; and only after a great length of time begins to present with varicose veins, soft, compressible, fluctuating points, which eventually inflame, ulcerate, and discharge much serous or glairy fluid. After this it is long before accumulation again takes place; or the sides of the sac or sacs may adhere and prevent it; or by the successive inflammation and ulceration of several sacs, numerous sinuses very difficult to heal are formed. The general health nevertheless remains undisturbed; and it is from mental anxiety only that the patient, who regards her disease as cancer, suffers much. The glands in the axilla are not affected.

The structure of the breast thus diseased is well described.

> "It is found upon careful dissection that the interstices of the glandular structure itself and the tendinous and cellular tissue connecting it, are in a great measure filled with fibrous matter, poured out by a peculiar species of chronic inflammation; but in some of the interstices a bag is formed, into which a serous or glairy, or sometimes a mucous fluid is secreted, according to the degree of inflammation attending it; and this fluid from its viscidity, and from the solid effusion which surrounds it, as well as from the cyst being a pefect bag, cannot escape into the surrounding tissues; but by its quantity, its pressure, and by the gradual yielding of the bag, it becomes of very considerable size; and vast numbers of these cysts are found to occupy each part of the breast, producing and supporting a slow but continued irritation, and occasioning an effusion of fibrous matter, by which the breast forms an immense tumour, consisting of solid and fluid matter. Within these bags of fluid, hydatids, hanging by small stalks, but some which, from their appearance, I supposed to be simple cells before I opened them, instead of being entirely hollow, had within them a cellular tissue, containing fluid which, though it produced the appearance of cells or hydatids on the outside, within assumed the character of anasarcous swellings." P. 22 and 23.

This disease is to be distinguished from chronic inflammation by the absence of tenderness and pain, and by the constitution being unaffected in the first stage, and afterwards by the plurality of fluctuating points and the fluid discharged; and from scirrhous tubercle by the absence of darting and burning pain, by the continuance of health, and by want of hardness. Another peculiarity of this disease is, that it does not contaminate other structures, does not extend by absorption, and has hitherto been found to be confined to a single breast only.

The treatment consists in puncture if only one bag of considerable size is recognized; and in removal by incision, providing there are several and the gland is generally affected. In this operation it is requisite to remove all the hardened substance, and every particle of cyst, in order to preclude the regeneration of the disease.

The history, pathological characters, and mode of treating this disease Sir Astley illustrates by the details of twelve cases. The last of these possesses peculiar interest in furnishing an instance of complication with the scirrhous or cancerous tubercle. The patient, an unmarried lady of twenty-nine, healthy in appearance, but of thin spare habit, came to London in November 1822 to undergo an operation. Though the hardness of the tumour induced Sir Astley to fear that it was scirrhous, the youth and healthy appearance of the patient, with the fulness of the breasts, encouraged the hope that it might be free from malignity. The breast was removed; and upon inspection the upper part was found to present the appearance of scirrhous tubercle, and in the lower were contained several cellular hydatids. The disease recurred in less than twelve months; the ulceration spread and went deep; and the unhappy lady died after the most agonizing sufferings.

The second species of hydatid disease of the breast is represented as difficult to be understood, without the advantage of the engraved delineation. From this, together with the description, the interior of the breast appears to have been occupied by hard masses of coagulated lymph or albumen deposited in the interstices of its fibro-cellular tissue. Between these again were cellular bags of serous fluid, in which floated cysts of various size, and in each of which hung a cluster of swellings like *polypi* attached by a stalk. Many hydatids were detached both in the cystic fluid and in the solid albuminous matter of the breast; they were egg-shaped; and though they varied in size, the largest did not exceed that of a barleycorn. Cut into sections, they were found to consist of concentric laminæ not unlike the layers of the onion. The containing cyst is represented as a vascular and secreting membrane, and the ambient solid tissue is described as liberally supplied with vessels.

Sir Astley expresses a doubt whether the hydatids here described are not the same, or similar to the globular hydatid described in the ensuing paragraph, and that the only difference is, that they have been destroyed by the pressure of the surrounding solid matter; or whether they are productions formed by the arteries of the part. If they are hydatids, they appear to belong to the genus *Echinococcus* of Rudolphi.

This form of disease appears not to be common, and Sir Astley Cooper gives only one example of its occurrence. The only remedy is extirpation.

The third species of hydatid tumour of the female breast is the ordinary globular hydatid, *(echinococcus, coenurus,)* found in many of the organs of the animal body. Of those already described, Sir Astley, if we do not misunderstand him, doubts the animal nature or independent vitality. To this species, however, he hesitates not to assign the character of animals, both from their anatomical structure, and from several of their vital phenomena. The following description, which we read with much interest, deserves particular attention, because, so far as we remember, it furnishes the most accurate account extant of several points stated either imperfectly or ambiguously by most authors who have written on these animals.

"The hydatid is contained in a cyst, formed in the breast by the adhesive process; for wherever it is deposited, it excites irritation, and becomes surrounded and encased by an effusion of fibrine which is highly vascular; and its internal and secreting surface is directly applied to that of the hydatid, and a slight moisture exists between them, they having no vascular connection.

"In the breast I have only seen them exist singly, but in other parts of the body great numbers are found.

"It is a semi diaphanous bag filled by a clear water, and it is uniformly smooth on its external surface.

"It has no opening or inlet, so that it must derive its nourishment by absorption from its external surface. It is composed of two coats; the external is of considerable density, and if any opaque body be placed behind it, it has the shining appearance of mother of pearl, and reflects the rays of light from its surface.

"It possesses a considerable share of elasticity, and rolls itself up when it is broken.

"This external layer is lined by a very delicate internal membrane, which appears to be its uterus; for from its interior a multitude of small hydatids grow, which at first adhere to the membrane, but afterwards become detached, from its falling into the fluid which the hydatid contains.

"If, therefore, the fluid contents of the hydatid be collected in a glass, an immense number of small hydatids will be discovered floating in them.

"Each of these small bags becomes in its turn a parent hydatid, producing young upon its internal surface, in a similar manner to the parent cyst.

"I am induced to believe them to be distinct animals; first, because they have an existence and growth of their own, having no vascular connection with the part in which they are found, but being only encased and surrounded by a vascular and secreting cyst.

"Secondly, because they have the power of producing upon their interior surface their own species.

"Thirdly, that in the brain of sheep a similar bag is found, which, for several hours after the sheep has been killed, if it be put into warm water, has a distinct and very considerable vermicular motion: and, fourthly, because on the surface of the abdominal viscera, and sometimes in their interior, an hydatid is found with a mouth and neck added to it; and consequently receives its food through the mouth, like other animals.

"The globular hydatid, therefore, may be considered, as to its mode of nourishment, the link in the creation between the animal and vegetable, as it receives its nutriment by absorption as the vegetable does; but the *tænia hydatigina*, as it is called, which has a mouth, is a perfect animal, with respect to the manner of its nutrition.

"The hydatid is supposed to be deposited in the structure in which it grows, carried there by the blood. Into whatever part it is thrown it excites irritation, and becomes enclosed by an adhesive process, and which forms the cyst in which it is enveloped; but their origin is obscure, and the opinions respecting their deposition hypothetical.

"The parent hydatid is supported by a secretion from the internal surface of the cyst in which it is found; but the small hydatids in it are probably nourished by the fluid which the parent hydatid contains, so soon as they drop from, and cease to be connected with the parent cyst.

"When one of these hydatids is produced in the breast, an inflammation is excited by it, and a wall of fibrine surrounds it; it feels hard, and from the small size of the hydatid a fluctuation cannot be discovered; but as the hydatid grows, although the quantity of solid matter increases, yet as the fluid in the hydatid becomes more abundant, a fluctuation in the centre of the tumour may be ultimately perceived.

"Sometimes when the hydatid has considerably enlarged, it produces a suppurative inflammation; and when the matter is discharged either by the lancet or by ulceration, the hydatid escapes at the opening; and there is in the collection of preparations at St Thomas's Hospital, an hydatid which was thus discharged by ulceration from an abscess in the breast." Pp. 46—49.

The treatment consists either in incision and expulsion of the cyst, or the insertion of a seton, the effect of which is to cause its death and subsequent expulsion.

The *chronic or lobulated mammary tumour* occurs chiefly between the ages of 17 and 30 years, after which it is rarely observed. The constitution may be, and often is, free from affection; and the disease is represented as connected with uterine sympathy. It occurs chiefly in the unmarried or the married who are barren. It begins without pain, and may continue long indolent, though in some few cases after a lapse of years it is accompanied by an aching rheumatic sensation. It consists of a loose moveable swelling, composed of several distinct lobes separated by depressions, seldom attaining a large size, and entirely free from malignancy or tendency to destructive ulceration.

Dissection shows it to be contained in a bag or capsule formed of fibro-tendinous tissue, similar to that which envelopes and penetrates the gland, growing from the glandular structure itself, yet capable of moving upon it. The large lobes of which it consists are composed of smaller lobes, which are separable by maceration.

Besides the predisposing cause furnished by uterine irritation, occasional causes are found in mechanical violence, as a blow or hurt on the breast, or the continued pressure of stays.

The treatment consists in regulating the general health, and attending to the secretions on which it depends, by means of the compound calomel pill at night, and infusion of columbo and rhubarb, with carbonate of soda twice daily, or, if the uterine periodical discharge be deficient, by means of the blue pill and compound extract of colocynth every fourth or fifth night;—and the local application of the mercurial gum-ammoniac plaster, or the iodine ointment. The most effectual and certain remedy, however, is the establishment of the natural and healthy circulation of the uterus, and of the mamma itself; and hence it often happens, that marriage and pregnancy remove it entirely. Excision is quite unnecessary; but if the mind of the patient be anxious and apprehensive, the operation is of the simplest kind; nor is the disease liable to recur.

The history and characters of this disease are illustrated by short notes of ten instances; in six of which the tumour was removed by extirpation, in two it disappeared under remedies, in one in consequence of pregnancy, and in one it appears to have been under treatment. After the cessation of the menstrual discharge, they may assume new and malignant action.

The origin of the *cartilaginous* and *ossific* tumour is explained by supposing gelatine to be effused in consequence of inflammation, and afterwards to become penetrated by vessels which secrete cartilaginous matter and phosphate of lime, which is removable by immersion in acids, while the gelatinous and cartilaginous basis is left. The only remedy is extirpation.

Of the *adipose tumour*, which may occur in this gland, or rather in its cellular tissue, as well as in other situations, nothing peculiar is stated.

The *large and pendulous breast* is represented as an absolute growth of the secreting lobes of the gland, which may be distinctly felt to be enlarged and hardened, and sometimes accompanied with much tenderness. It is, therefore, not like the pendulous breast of elderly and corpulent females, or the enormous dugs of those who have been relaxed by long residence in warm climates, but an actual *hypertrophy*, or excessive nutrition of the gland. The skin seems at the same time to be distended or rather hypertrophied. It occurs chiefly in the young, the only two cases which the author gives being found, the first in a girl of 23, and the other in a young lady of 15. In unmarried females who have attained the age of 30 or 35 another form of the disease is observed. The breasts become enlarged, but not pendulous ; and upon careful examination, each lobe of the gland may be felt distinctly enlarged and hardened, but moving freely on each other. Both breasts are affected, generally one more than another ; and the pain with which this enlargement is attended is aggravated during the menstrual periods, and by exposure to cold. After this enlargement has gone on for a few years, absorption takes place, and the breast wastes away until it entirely disappears. This disorder is similar to what is observed in the testicles of the male, and is a species of *atrophy* of the mammary gland.

The treatment of the first form or *hypertrophy* of the mammary gland consists in the use of a suspensory bandage from the neck round each breast, to give support, and diminish the uneasy sensation resulting from weight, in regulating and supporting the menstrual secretion by aloetics and chalybeates, and in improving the digestive functions and the general health, by compound calomel pill, or chalk and mercury.

In the treatment of the second form or *atrophy* of the mammary gland, the principal object should be to restore the menstrual secretion, if possible, by the means above-mentioned, and the use of the hip-bath, and to abate local uneasiness by the application of leeches, and afterwards of the mercurial gum-ammoniac plaster.

Of the *scrofulous tumour* of the *breast* little is said, unless that operation is neither necessary nor justifiable ; and that the proper treatment consists in improving the constitution by a warm, dry, atmosphere, regulated temperature, tepid sea-bathing, gentle and regular exercise, and food of the most digestible and least stimulating description. The usual tonics and laxatives are recommended. " Local treatment," says the author, " avails but little ; a stimulating plaster or a lotion to the tumour, when the health is improved, may excite the absorbents to remove it."

The *irritable tumour* of the female breast is represented as occurring under two forms, or perhaps degrees.

In the first, which takes place generally between 15 and 30 years of age, though no swelling is perceptible, the whole breast becomes exquisitely tender ; and if handled, the pain which results may continue for hours. This pain, which is not confined to the gland, but may extend to the shoulder, the arm, and fingers, and even the whole side of the person, is described as similar to that of *tic douloureux*, darting like an electrical shock through the part, so severe as to prevent sleep, and is aggravated previous to the menstrual period, but is relieved during, and immediately after, menstruation. This painful complaint may continue for months or years with little intermission, but without malignant tendency.

In the second form of irritable breast, a tumour, more or less distinctly circumscribed, highly tender, acutely painful at intervals, especially prior to menstruation, moveable, varying from the size of a pea to that of a marble, is developed in the gland, and may continue for years without suppurating, and may become indolent, and at length disappear spontaneously.

> " Upon dissection, they are found to be composed of a solid and semitransparent substance, with fibres interwoven in it, but without any regular distribution ; and I have not been able to trace any large filament of a nerve into them. They seem to be productions of the cellular membrane of the part, rather than of the glandular structure ; and they are therefore met with in the cellular membrane of other parts of the body, accompanied with similar painful sensations." P. 78.

The treatment consists in abating the irritability of the system, by such remedies as calomel with opium and hemlock, and occasional aperients, in soothing local suffering by soap cerate and extract of belladonna in the form of plaster, or by the latter in the form of poultice ; and in restoring the defective menstrual secretion by aloetics and chalybeates, and the occasional use of the hip-bath. Though operation is not required, and is out of the question in the first form of irritable breast, it is sometimes expedient to remove the second form when it consists of a distinct tumour. In some of the instances given by the author in illustration, an approach is made to the neuromatic or painful subcutaneous tubercle of Mr William Wood.

Ecchymosis of the breast, which is observed chiefly in girls under 22 years of age, is a singular complaint, which forcibly illustrates the sympathy between the womb and the breasts. It consists in the appearance, a few days before menstruation, of a *vibex*, or large spot as it were of extravasated blood, with much tenderness and pain, which extends along the inside of the arm to the tips of the fingers. In some instances it disappears in the course of a week after menstruation, but recurs more or less regularly each time that discharge should be secreted. In other instances which are more severe, it continues till the next menstrual indisposition, and may then disappear to return at some future period.

It is entirely void of danger ; but it is to be regarded as an indication of diminished, irregular, and occasionally profuse uterine secretion; and in that respect is to be treated chiefly by remedies which may place that function in a uniform and more healthy state. The best local application is the *liquor ammoniæ acetatis* with alcohol, in the proportion of five ounces of the former to one of the latter.

In nine beautifully coloured engravings, Sir Astley represents the appearance and internal structure of the principal forms of tumour described in the foregoing pages. The descriptions are given with great accuracy, and form valuable illustrations of the pathology of the female breast. We trust that at no long time we shall see the second part of the work, in which the author proposes to illustrate the nature of scirrho-carcinoma, and the fungoid tubercle. Upon such points, the observations of a surgeon so experienced cannot fail to be read with the greatest interest.

Art. VIII.—*An Essay on the Use of Nitrate of Silver, in the Cure of Inflammation, Wounds, and Ulcers.* By John Higginbottom, Nottingham, Member of the Royal College of Surgeons of London. Second Edition, much Improved and Enlarged. London, 1829. 8vo. Pp. 204.

Of the virtues of the nitrate of silver as a local agent in the treatment of disease, surgeons have long had a vague and general conception. They have used it as an escharotic, to destroy parts which it was desirable to remove, to consume exuberant granulations, and to correct unhealthy or poisonous discharges. They have used it to the surface of sores, with the view of altering their action and causing them to assume a more healthy one; and occasionally it has been employed to promote cicatrization. It cannot be said, however, that it has been always employed upon clear, evident, and well-established principles; and if in many instances its use is not highly empirical, or regulated by no fixed rule, it is certain that sometimes the practitioner is induced to try its effects, without distinctly knowing why or wherefore, and without being able to say what object he wishes to attain by its application.

It must be some gratification to the practical surgeon to learn, that on this subject he has now the means of being more accurately informed; and to know that in the present short essay he will find ample instruction on the capabilities of the nitrate of silver, on the disorders which require its application, and on the methods by which its sanative effects are most readily insured. To Mr Higginbottom belongs the merit of undertaking to demonstrate, by an extensive series of experiments, the great utility of this agent, and to show of how many applications it is susceptible in the treatment of local diseases. Without going so far as the ingenious though zealous author of the practice does, it is evident that, employed in the manner and upon the principles observed by him, it may tend to simplify very much the treatment of many local diseases.

As the general basis of his principles and practice, Mr Higginbottom begins with the proposition, that external or superficial inflammation may be completely subdued by the local application of nitrate of silver. For this purpose, it is in some cases requisite merely to blacken the cuticle; in others to induce vesication, which, however, is less irritable than that resulting from cantharides; and in others, for instance when suppuration is to be prevented, it is necessary to form an eschar or enclosing and adherent scab or crust.

When it is used with the intention of vesicating, the part must be washed with soap and water and dried, and over the surface again moistened a rod of nitrate of silver is to be repeatedly passed, touching not only the inflamed but the healthy skin, to the extent of an inch or more beyond the former. The part is exposed to the air to dry, and must be kept cool. In twenty-four hours, if the nitrate has been properly applied, a little vesication is observed, the inflammation is found to have subsided somewhat, and its progress is arrested; and if the patient still complains of any part which has been untouched, the caustic must be again applied. On the third day there is more vesication and less swelling, and the patient complains of pain like that of a blister; but the part when examined is puffy, and is found to be free from inflammation. On the fourth day the vesications begin to disappear, while the fluid by which they were formed is dried into crusts, which should be allowed to drop off spontaneously. This they generally begin to do on the fifth day, leaving the subjacent parts free from soreness and inflammatory action.

On the subject of adhesive inflammation, Mr Higginbottom states in general terms, that this process is directly and powerfully induced by the nitrate of silver in incised wounds, punctured wounds, and bruised wounds, and that in the two last suppuration and sloughing are prevented. In spreading ulcers its effects have been long well known to the profession; but the experience of Mr Higginbottom enables him to say, that, applied in his method, it frequently shows its sanative effects in immediately subduing inflammation and inducing the healing process. In the case of inveterate and obstinate ulcers of the legs, it is represented as effectual, not only in relieving the distressing pain, but in healing the sores themselves in a more durable manner than any other remedy.

In the attainment of objects respectively appropriated to these several sorts of injury or disease, the nitrate of silver is applied by Mr Higginbottom in three different modes; 1*st*, to form an adherent eschar; 2*dly*, where this is impracticable, to produce an eschar only partially adherent or unadherent; and, 3*dly*, its application is combined with that of an emollient poultice.

Of the first mode of using the remedy the principle is, that a wound or ulcer, if excluded from the air by the adhesion of an eschar formed over its surface, is uniformly and infallibly healed. This fact has been long well known to many practical surgeons in the cure of chancres and other cutaneous sores, which, if well touched with nitrate of silver, so as to coagulate or indurate the discharge from them, and preserved undisturbed for days, are found to heal with great regularity beneath the crust or eschar thus formed. Mr Higginbottom appears to have carried this principle and its consequent application to the greatest extent of which it is susceptible. He justly insists on the absolute observance of the rule not to disturb the eschar or crust, on the adherence of which the certainty of the healing process depends; and with the view of securing this most effectually, he covers it previously moistened with a piece of gold-beaters' skin. The advantages of the method are stated in the following manner.

"In the surface of the wound the eschar supplies complete protection and defence, and allows the healing process to go on underneath, uninterruptedly and undisturbed. It renders all applications, such as plasters, totally unnecessary, as well as the repeated dressings to which recourse is usually had in such cases; and it at once removes the soreness necessarily attendant on an ulcerated surface being exposed to the open air. In many cases, too, in which patients are usually rendered incapable of following their wonted avocations, this mode of treatment saves them from an inconvenience, which is to some of no trifling nature."

"In this manner, in cases in which there would be much and long-continued irritability and pain, as in superficial wounds along the skin, all this suffering and its consequence in disabling the patient are completely avoided. A blush of inflammation forms around the eschar; but this gradually subsides without any disagreeable consequences, and the inflammation which would otherwise have been set up eventually prevented by the due formation of the eschar. In my earlier experiments I often observed this fact; but since that time I have always applied the nitrate of silver on the surrounding skin, and beyond any inflammation which might be present, or which might supervene."

Those who, in imitation of John Hunter, have healed wounds by what is termed *scabbing*, that is by allowing the blood and lymph to coagulate, and form an enclosing and protecting crust under which the wound heals, and which drops off when this is completed, are aware of the principle of this method, and of the advantages which it affords. Beneficial as it is, however, and greatly superior to the officious technical treatment by which the healing of recent wounds was too often retarded previous to the time of Hunter, it is represented by Mr Higginbottom as much inferior to the method now proposed, in being attended with more soreness and irritability, and in being much less certain than the method by eschar. On this point we do not feel competent to give a positive opinion, not having tried the latter method so extensively as the author himself. But from the few trials which we have made, and what we know of its chemical action, its operation, we conceive, is much the same. That the nitrate forms an eschar is, we presume, doubtful. That it coagulates the discharges on the surface of a wound or sore is certain ; and in this respect it imitates the process of spontaneous coagulation of blood and lymph at the surface of a wound ; and perhaps the great advantage of the nitrate of silver, applied in the manner of Mr Higginbottom, is, that it places in the hands of the surgeon a means of accomplishing with certainty that object, which only occasionally takes place in the spontaneous manner. On this property, indeed, Mr Higginbottom places so much reliance, that he thinks some cases of compound fracture may by it be immediately and permanently closed, and thus reduced to the state of simple fracture.

Though the crust is adherent in the case of recent wounds and small sores attended by little inflammation, and the process of cicatrization goes on without the formation of matter, in larger wounds and sores this is not the case ; and a little purulent matter may be formed beneath the crust, and thus keep it loose and detached in the centre, or at one of the sides, forming what Mr Higginbottom distinguishes as the *unadherent* eschar. The mode of procedure recommended in this case is to puncture the eschar by a lancet ; and after very gently pressing the matter from beneath it, to apply the nitrate of silver to the orifice thus made. We may add from experimental trial, that it is of immense importance in securing adhesion to carry the caustic, if possible, through the opening, and by pressing down the eschar or crust, to apply it as completely as possible to the subjacent surface, with the view of coagulating whatever matter is left. After this, adhesion is generally effected. The same plan is to be observed when matter oozes from the margins of the eschar; and either this or the puncture and subsequent application of the caustic may be requisite several times, where the sore or wound is large. When detached by accident, the caustic is to be applied anew to the whole surface. At length adhesion takes place, cicatrization proceeds, and its completion is indicated by the spontaneous decision of the crust.

When the purulent matter which should be thus periodically evacuated is allowed to remain, it is partially converted into a scab beneath the eschar, and its presence is indicated by soreness, heat, and some redness around. The eschar does not separate, but continues by its attachment to the scab, while healing is retarded. In this case a cold poultice for a few days is recommended; and upon the separation of the eschar, the nitrate of silver must be re-applied as at first, and attention must be given to the periodical evacuation of matter if requisite.

Mr Higginbottom does not contend for the indiscriminate use of this method of treatment to all cases. He dissuades the surgeon from its employment in large ulcers, or wounds which do not admit of the formation of a complete eschar, or where the ulcer or wound is so situate as to be incapable of remaining undisturbed. The extent and mechanical irregularities of several wounds must be a barrier to its universal use; and in parts of the body liable to much motion it is scarcely admissible.

Even these, however, Mr Higginbotton does not leave to the methods usually pursued; and he recommends as a means of accelerating and facilitating the healing process, the application of the nitrate of silver succeeded by a poultice, from day to day, till inflammation subsides and cicatrization begins to take place, when an adherent eschar may be formed. This method he recommends for neglected punctured wounds with pain, swelling, and ulceration, for recently opened abscesses, and for deep-seated inflammations of the fingers. In such circumstances, he represents the application to be necessary, not only to the surface of the sore or sores, but to every orifice, and in every cavity, formed by the disease, and even to the surrounding inflamed skin. By this mode of management the pain and swelling are alleviated, a free issue for secreted matter is secured, and granulation and cicatrization are promoted.

In further illustration of the advantageous effects of this method of treatment, Mr Higginbottom proceeds to exemplify its operation and results in various instances of external inflammation, punctured wounds, bruised wounds, ulcers in general, old ulcers, and finally in the treatment of burns and scalds. In these several forms of disease or injury the success which he has obtained is very great, and demonstrates either that the remedy is very effectual, or that it has been very well applied, or that the cases must have been mild and manageable.

The forms of external inflammation to which Mr Higginbottom thinks the use of nitrate of silver applicable, are ordinary phlegmon or cellulo-cutaneous inflammation, whitlow, rose, and inflammation of the absorbents. In the first case he applies the remedy freely over the whole inflamed surface, so as in some instances to produce vesication, and keeping it cool, if suppuration takes place, discharges it by a small puncture, to the orifice and cavity of which, if possible, the same remedy is applied. In whitlow, in which patients seldom apply before some suppuration takes place, he directs a free opening to be made, and the whole interior of the suppurated cavity to be freely touched by the nitrate of silver. If inflammation returns, the application must be repeated. In slight cases application over the inflamed surface is generally sufficient to check the progress of the disease.

In the treatment of erysipelas the author does not at first employ the nitrate of silver, but puts in active use the most powerful constitutional means of cure. If these fail, the remedy is applied freely and extensively over the whole inflamed surface, so as to blacken it completely; and its constant effect is represented to be a speedy check to the local inflammation, alleviation of heat and pain, prevention of suppuration, and the gradual but certain extinction of the disorder. It is further interesting to observe, that the constitutional symptoms appear to have undergone a remarkable abatement in most of the cases soon after the nitrate of silver has been applied. Thus the delirium becomes milder and less constant, the pulse becomes slower, and all the symptoms of general fever disappear. It is nevertheless important not to neglect to continue the use of general antiphlogistic measures.

Inflammation of the absorbents is generally a secondary affection proceeding from the irritation of a sore or wound. In this case Mr Higginbottom applies the nitrate of silver both to the exciting ulcer, if it can be detected, and to the skin along the course of the inflamed lines, with the effect of speedily suspending the secondary inflammation and of curing both.

Punctured wounds are divided in reference to the use of this mode of treatment into seven varieties;—simple punctured wounds, inflamed punctured wounds, neglected punctured wounds, large punctured wounds, punctures received in dissection, bites, and leech-bites.

In the case of recent simple punctures or stabs, after removing loose skin, to the wound, and an inch of the surrounding skin previously washed and moistened, the nitrate of silver is directed to be applied lightly, not to occasion vesicles; and the part is afterwards to be exposed to the air. The eschar thus formed is adherent, and the case requires no further attention. When the puncture has been neglected, and matter is formed, with heat, pain, and swelling, and its edges are red and sore, after evacuating the matter, the caustic is applied freely to the cavity of the wound and to the surrounding skin, upon which an adherent eschar is generally formed, the soreness, heat, and swelling rapidly diminish, and the wound is healed without further trouble. If the persistence of symptoms indicate the formation of a deep-seated abscess, the wound should be opened freely, the nitrate of silver applied within the cavity, and the parts enveloped in a poultice of bread-crumb and water, or a lotion of cold water. The re-application of the nitrate may be requisite every second or third day, till the inflammatory symptoms are totally extinguished. To demonstrate the efficacy of the caustic in such circumstances, Mr Higginbottom states, that in several instances in which he had applied it over inflamed surfaces, without being aware that suppuration had taken place, the pain was in the meantime relieved and the heat and redness abated; and though their return in the course of a few days indicated the presence of matter, a free incision and application of the remedy, followed by the cold poultice, put the case in the direct way of healing. In cases in which, though the punctured orifice is healed, it is surrounded by spreading erysipelatous redness and swelling, the effectual application of the remedy over and beyond the inflamed parts, so as to form an eschar, he found to arrest its progress and extinguish the action.

On the subject of wounds received in dissection, so important to the professional reader, Mr Higginbotom states, that since he began the free use of nitrate of silver, all the alarming effects of such wounds have been invariably prevented. In the years of 1813 and 1819 respectively, he personally incurred much danger from puncture in the inspection of dead bodies; but since the latter period, though repeatedly exposed to the effects of inoculation, the danger, he assures us, has been in every instance averted by the prompt and free application of this substance. After detailing in his own person the principal circumstances of a threatening case, which terminated favourably under the use of free incision, calomel to affect the gums, and a large blood-letting, he draws the following conclusions regarding the future treatment of cases of this description:

"It is my opinion, from what I have since experienced, that this severe and painful illness would have been entirely prevented by the free application of the nitrate of silver, and that it would have been the only local remedy necessary.

"In the second state of the puncture, where a small tumour is raised, I would remove this tumour by the lancet, before applying the nitrate of silver, to form an adherent eschar, and I would adopt the precaution of applying it on the surrounding skin, and beyond the swelling.

"At a later period still, I am of opinion, that, when the hand had become much swollen and tense, and the inflammation had spread up the arm, the external application of the nitrate of silver, on the whole inflamed and swelled surface, would have subdued and checked the inflammation, and that the constitutional affection would have ceased." Pp. 84, 85.

That these therapeutic measures are good, we have often had occasion to see verified. But it must be remembered, not only that not every instance of punctured wound received in dissection becomes inflamed, but that not every instance which becomes inflamed assumes the peculiarly severe, and frequently fatal, form of the disease, which has been so little amenable to medical and surgical treatment. Doubtless these wounds, when freely treated in their recent state by the nitrate of silver, we have often seen succeeded by none of the peculiar malignant inflammation of the subcutaneous cellular tissue; and in all probability the action of the substance was to coagulate the discharges of the wounded surface and prevent absorption, or the proper action of the poison. But the evidence of this is purely conjectural; and in all instances it is impossible to say whether, if the wounds had been untouched by this substance entirely, they would have assumed the malignant action. If we are not misinformed, some of the fatal cases already recorded have been treated with nitrate of silver in the beginning; and as the extreme difficulty of detecting all the punctures is the only mode in which the objection may be explained away, it would be desirable to have the fact ascertained, before the surgeon or dissector repose more confidence in this remedy than he at present does. Of late years we have been in the habit of dropping the concentrated nitric acid into wounds of this description; and though the immediate pain is severe, and the subsequent inflammation not inconsiderable, it is always circumscribed and adhesive in its action; and we have reason to believe that the remedy is one of genuine efficacy.

To return, however, to Mr Higginbottom;—for the successful management of bruised wounds especially of the skin, he recommends strongly early application of the nitrate; and as an inducement, he states positively that he has not had a single instance of this injury, in which, if the application was early, he was unsuccessful in effecting a cure by the adherent eschar, unless the skin had been unhealthy and discoloured from previous ulceration, or tender as in the aged from exposure to the fire, or œdematous. The tendency to the formation of a slough so often betrayed by injuries of this part he represents to be greatly diminished, if not altogether annihilated, by the early use of the nitrate of silver, which he thinks preserves the vitality of the part, and obviates that tendency to death which is observed in the secondary inflammation of the injury. His practice of removing by scissors the slough when the patient applies too late after the accident to prevent its formation, is, however, not in accordance with good pathology. No slough of this kind should be disturbed, much less removed; and it is by far the safest course to allow it to be cast in the usual way by the vessels of the part. In such instances as this only does the author betray an excessive partiality for his own mode of treatment.

When the recent bruised wound is too large to heal at once by eschar, the nitrate of silver is recommended to be applied first on the surrounding skin for several inches, so as not to induce vesication, and over the wound not covered by the skin, which is then to be brought in as near apposition as possible by adhesive plaster only, which in this manner does not irritate, and allows the wound to be healed nearly by the first intention.

In accommodating his remedy to the healing of ulcers, Mr Higginbottom admits that the method by eschar is suited to small sores only; and for the treatment of large ulcers he finds that the following modification is much better than attempting to form an eschar.

> " If there be swelling or œdema, I direct the patient to take a dose of opening medicine, to apply a common poultice of bread and water over the ulcer, and to keep in bed for four and twenty hours. The inflamed parts must be washed with soap and water, and wiped dry. They are then to be moistened with water, and a long stick of the nitrate of silver must be passed all over the inflamed and ulcerated surfaces, twice, and rather more freely on the ulcer itself, and on the surrounding skin. Lint must then be put on the ulcer, and the whole of the inflamed and ulcerated parts must be covered with the neutral ointment, spread on linen; a compress of five or six folds of fine linen is then to be applied over the ulcer, and a common roller, not too tight, to keep on the whole. The leg is to be examined on the fourth day, when it will be found that the inflammation is nearly, if not entirely gone, and the ulcer is in a healing state. The nitrate of silver must then be applied on the whole of the ulcer, and once lightly over the skin immediately surrounding it, one or two inches in breadth; the lint and ointment are to be applied as before, and the bandage

rather tighter. The case must be treated in this manner, every third or fourth day, until the ulcer be healed. I would recommend wearing a calico roller, for some time afterwards till the leg has recovered its usual strength. The patient may walk about after the first or second application of the nitrate of silver." Pp. 113, 114.

Old ulcers of the legs have formed the opprobium of surgery and the stumbling-block of the surgeon; and Mr Higginbottom, like others, has had occasion to be convinced of the occasional inefficiency even of the much commended method of Mr Baynton. Every mode of treatment indeed has its obstinate cases, which perversely resist all its appliances; and time only can tell whether the following one which is now recommended by the present author is more justly entitled to the confidence of the surgeon.

" The first thing I direct my patient to do in such a case, is to apply a common white bread and water poultice, to keep in bed for eighteen or twenty-four hours, to allow any swelling of the leg to subside, and to take a dose of opening medicine. The leg is after this to be washed well with soap and water, to free it from any oleaginous substance, or loose cuticle; it is then to be wiped dry with a towel, the inflamed part is to be moistened with pure water, and the nitrate of silver is to be passed twice over it, and a little beyond it on the healthy skin; and then, more freely, to every part of the ulcer, and particularly the edges and immediately surrounding skin; a piece of lint is to be put over the ulcers, and linen spread thick with the neutral ointment, over the whole inflamed and ulcerated parts; a compress of linen, and a common calico roller are to be applied in the last place, the latter not tight, but just so as to retain the dressings in their place. The patient is obliged to remain a few hours in bed, on account of the pain occasioned by the application of the nitrate of silver; but after this has once subsided, he enjoys more relief than from any former application, and sleeps soundly all night, for the first time perhaps for years. The dressings are to be taken off at the expiration of the fourth day, the inflammation is then found to have nearly subsided, and the ulcer is become more healthy in its appearance. If any of the plasters adhere, they may remain until the next time of dressing; the applications to the ulcer itself are readily removed, as there is usually a free discharge of lymph from its surface. This discharge is to be simply removed by a little linen or tow; the nitrate of silver is again to be applied all over the wound, on its edges and the skin immediately surrounding it; and if any of the plaster be detached, and there be any inflamed part, slight sore, or excoriation, those parts are to be slightly touched with the nitrate of silver. About the expiration of three more days, the eschar is found to be detaching itself from the surface previously inflamed, and all the inflammation gone. The patient now makes no complaint, is free from pain, sleeps well every night, is able to follow his employment; there is generally a free serous discharge from the ulcer, free from fœtor. The nitrate of silver is again to be applied over the whole surface of the sore, its edges, and the adjacent skin. This plan has the effect of preventing any inflammation of the surrounding skin, or irritation on the surface of the ulcer itself. It is to be repeated every third or fourth day, till the ulcer be healed. When the ulcer is near the ancle, deep, of long standing, and with hardened edges, and with enlargement of the vena saphæna, and swelling of the foot, I have added, to the mode of treatment just described, the treatment by strapping recommended by Mr Baynton, and recently improved by Mr Scott. The latter gentleman recommends the emplastrum plumbi, which is not so apt to irritate the skin; but where the nitrate of silver is used, the common adhesive plaster may be used without inconvenience. If any excoriation did arise from any cause, a slight application of the nitrate of silver would induce a firm eschar, and prevent any ill effect. I prefer that the adhesive plaster should be spread upon dimity, which is stronger, and gives more support than the calico. It may be well to state, that this kind of strapping is prepared by Gale, Baker and Warde, Chemists and Druggists, Bouverie Street, Fleet Street, London." Pp. 129—132.

This mode of treatment is rational and promises well; and from the cases given in illustration by the author, it appears to be highly efficacious. To establish its universal efficacy, however, will require a very extensive series of trials, and upon a very varied collection of cases of old ulcers,—a species of experimental inquiry which is most conveniently conducted in the practice of hospitals and dispensaries, to which the method is certainly recommended by its economy of time and applications.

In the treatment of burns by means of the nitrate of silver, the experience of the author does not appear to be so extensive as in the other departments of surgery already considered. So far, however, as it goes the results are satisfactory. In recent burns or scorches the transition of the nitrate of silver over the surface is represented as highly efficacious in permanently alleviating pain and heat, and preventing vesication; and where the cuticle is detached its application is said to prevent consequent ulceration. Again, however, we find Mr Higginbottom removing sloughs by the scissors and forceps, in order to apply his favourite nitrate of silver. This excessive partiality to the use of one agent, to the exclusion or even violation of good rules in surgical practice, we fear will injure the real merits of the remedy; and we are certain that those disposed to cavil must be perfectly shocked at the outrageous fondness for cutting off sloughs. True it is, the subsequent application of the remedy obviates some of the evils resulting from the premature and artificial removal of sloughs. But if Mr Higginbottom wishes to see his mode of treatment get into general use, he should neither himself adopt practices which are in opposition to good pathology, nor recommend them to others, who may be less competent either by skill or dexterity to counteract their pernicious consequences.

The first appendix contains some observations on the use of the nitrate of silver as a means of counter-irritation by blister; on its use in gun-shot wounds, in cases of neuralgia, and other miscellaneous complaints. Its efficacy in the way of blister is illustrated by a case of enlargement of the knee, and a case of urethral inflammation, in both of which it was highly successful. Its efficacy in gun-shot wounds can hardly be inferred from its employment in the three slight cases given in these pages. In neuralgia it promises to be useful, but, like all other means cannot be universally so. A good case of contracted rectum in a man of 50, entirely removed by the application of a rod of nitrate of silver to the contracted part of the gut, shows how much the surgeon may accomplish by perseverance in the judicious application of useful remedies. Mr Stafford would have divided the stricture by incision. Mr Higginbottom appears to have cured it by the nitrate of silver.

The second appendix contains, in a letter from Mr Webster of Dulwich to Dr Marshall Hall, some cases illustrative of the effects of the remedy on burns, stabs, bites, and strictures, and an account of a fatal case of ulceration of the mucous membrane of the larynx and pharynx,—the diptheral inflammation of M. Bretonneau apparently, in which the application of the caustic gave great relief. This alleviation induced Mr Webster to use it in three similar cases with favourable results. But in a fourth, in which it was used also, the child died, and the uvula and tonsils were found deeply ulcerated, and the tracheo-laryngeal membrane inflamed. Mr Webster regards the disease as entirely distinct from that described by Mr Bretonneau.

In the foregoing observations we have been desirous to give our readers a candid and impartial account of the method of treatment pursued by the ingenious author. We have also sincere pleasure in saying, that the method is in general highly rational, and, though occasionally bold, is not so rashly so as not to entitle it to a fair trial. It must be admitted that Mr Higginbottom has shown to what extensive and diversified uses the nitrate of silver may be put in the practice of surgery, and what powerful means an ingenious practitioner possesses in the knowledge of the application of this remedy. The only objection is, that perhaps Mr Higginbottom is a little too exclusive in his applications. Nitrate of silver, it may be said, becomes in his hands a perfect panacea. It is in short good for every thing and never injurious. Mr Higginbottom must excuse us for telling him before taking leave, that this is the rock on which all new or much eulogized remedies are destined to split; and if he wishes the real and genuine merits of his method, which we think are truly great, to be well appreciated, and permanently admitted, he must beware not to overrate them, or to recommend its use in cases in which, if not absolutely improper, its reputation must suffer by being at least useless.

ART. IX.—*Precis d'Anatomie Pathologique.* Par G. ANDRAL, Professeur à la Faculté de Médecine de Paris, Membre de l'Academie Royale de Médecine, du Conseil de Salubrité, des Bureau Central des Hopitaux, &c. Tome I. et II. Pp. 579. Part 1 and 2. Paris, 1829. 8vo.

Outlines of Pathological Anatomy. By G. ANDRAL, Professor to the Faculty of Medicine, &c. &c. Paris, 1829. Vol. I. and II. Part 1. and 2. 8vo.

THE high reputation which M. Andral acquired by his work on clinical medicine, naturally leads the medical public to look with no ordinary expectations to any work announced by that author; and by no one perhaps could a work on pathological anatomy have been undertaken, with more reasonable hopes of satisfying public expectation. Whatever advantages could result from extensive opportunities of collecting facts, from judgment in arranging them, and from experience in drawing conclusions, might all justly be expected to be combined in the work of an observer whose knowledge of disease and its effects had been acquired in the wards of La Charité, and under the experienced eyes of Lerminier.

It is difficult to say, nevertheless, whether this species of anticipating estimate is favourable or disadvantageous to the work of which it is formed. Expectations previously entertained in this manner may be so unreasonably high as to be incapable of being realized; and disappointment may ensue, because an author who has already performed his task well, does not exceed himself, or even, it may be, fails to approach in a new line his former excellence. This is one reason why the expectations entertained of a work may not be realized by its appearance. There is still another. The author who has already been successful, places, it may be, too much confidence in the renown which he has already acquired; and instead of endeavouring to raise or even sustain his name by his book, may satisfy himself with an inverse method, and leave his book to be raised by his acquired reputation.

Whether from the operation of the one or the other of these causes, the present work scarcely realizes the hopes to which its first announcement gave birth. It is doubtless a passable work, so far as the mere general characters of a well-finished book can be said to go. Its materials are good, and they are arranged with an air of scientific precision; but it is neither so good as we expected from M. Andral, nor is it, properly speaking, a very good work on pathological anatomy. Whether this opinion is well founded or not may be understood from the following account of it, which we now proceed to lay before our readers.

The whole treatise consists of two parts;—the first, composing the first volume, devoted to the subject of general pathological anatomy,—the second, consisting of two parts, also forming a volume, to that of special pathological anatomy.

The arrangement and distribution of the materials is entirely physiological. M. Andral begins at once to inform his readers, that in every living body are observed three vital processes,—first, *capillary circulation*, or the conveyance and reduction of the nutritive fluid, consisting of blood and lymph, or both, to and from the several organs;—*secondly*, *nutrition*, or the process by which, from the mass of the nutritious fluid, each organ selects atoms similar to those of which it consists,—constituting a species of vertiginous motion in the minute parts, by which the solid particles, atoms, or molecules of organs are incessantly and alternately combined with and detached from them;—and, *thirdly*, *secretion*, or that action by which, when an atom of the nutritious fluid touches a living atom, there is detached a serous fluid void of proper organization.

Besides these processes, which are common to all living bodies, both of the animal and vegetable kingdom, there is observed in man, and the beings placed in the same rank in the zoological scale with him, a fourth action, of which the nervous system is the seat and instrument. This action, which, after the example of Adelon and other recent physiological authors, M. Andral distinguishes by the name of *innervation*, he represents to exercise over circulation, nutrition, and secretion, a control, necessary and extensive in proportion to the rank which the animal tribe holds in the scale.

Lastly, since the blood furnishes the materials of nutrition and secretion in all their various forms, the qualities of the entire mass of circulating fluid, of which that of the different capillary circulations are integrant and constituent parts, ought, it is inferred, to exercise an influence over all the phenomena of nutrition and secretion; and from this common tendency of the nervous centres, and the general circulation to the same points, as it were, it results that in the beings of this class the life of each individual part is confounded with the general life; or, in other words, there is a general indivisibility of the vital principle through the living system.

After settling these preliminary points, M. Andral proceeds to say, that, considered in the state of disease, each living part presents alterations, either simple and isolated, or variously combined, of the several fundamental processes now enumerated as going on in the healthy body. The blood, for example, which an organ receives in the normal state may be modified in quantity, and constitute *lesions in circulation.* The atoms composing the different solids may be altered either in mode of arrangement, or in number, or in consistence, or in nature, and constitute *lesion of nutrition.* The materials which in the substance, or at the surface of organs, ought in the normal state to be separated from the blood, may be changed either in quantity or quality, and give rise to disorders of secretion. And, lastly, if it be admitted that in the state of health the *innervation* of one part, and the composition and qualities of the blood of another, exercise an influence in each individual part of the capillary circulation, on the nutrition of each organ, and on each secretion, it follows, that in the state of disease most lesions of these several processes must be traced, in their original developement, to certain lesions, either of *innervation* or of *hematosis.* Upon these principles, M. Andral refers all morbid actions occurring in the living body to five great general divisions or sections, consisting of

I. Lesions of Circulation; II. Lesions of Nutrition; III. Lesions of Secretion, IV. Lesions of the Blood; and V. Lesions of Innervation.

The lesions of the three first classes, he then proposes to subdivide into two groups, according as their cause is a local modification of the affected part, *e. g.* erysipelas from insolation, or the suppuration round a foreign body, or as they are connected with some change of the blood or of innervation, as in the case of scorbutic petechiæ or strumous abscesses. From the phenomena of these lesions, he then proposes to ascend to their cause or causes, in which he assigns a conspicuous place to that increase of excitability, which has been denominated *irritation.* He does not admit the principle, nevertheless, that this constitutes the sole cause of these lesions; he allows that it frequently, but never necessarily, precedes their existence, and is inclined to view it in the light of a hypothetical mode of explaining phenomena not easily understood.

The term *inflammation*, which he defines to be *irritation* accompanied with redness, swelling, and pain, he rejects as once created in the infancy of science, and metaphorically conveying by its vague and indefinite meaning an idea neither distinct nor accurate.

After adjusting these preliminary points, M. Andral proceeds to the proper subject of his work, and examines the lesions of the circulation in his first section. These are in number only two;—one when the legitimate quantity of blood in the capillaries is increased;—the other when it is diminished. The first state he distinguishes by the name of *Hyperæmia*, which our classical readers are aware signifies *excess of blood* (ὑπερ ἁιμα); and the second is denominated *Anæmia*, or *deficiency* of the same fluid.

Of *Hyperæmia* our author distinguishes four several forms, 1*st*, *hyperæmia* by irritation, active or *sthenic hyperemy*; 2*d*, *hyperæmia* from impaired tone of the capillaries, passive or *asthenic hyperemy*; 3*d*, *hyperæmia* from impediment to the venous circulation, *mechanical hyperemy*; and, 4*th*, *hyperæmia* occurring after death, in consequence of the prevalence of physical and chemical laws over vital properties, or what may be termed *cadaveric hyperemy*.

Sthenic or active Hyperæmia, though nowhere clearly defined, consists, we are enabled to collect from the reasonings of M. Andral, in the capillaries, either of one organ, or of the sanguiferous system at large, being loaded with an unusual quantity of blood. This, however, does not depend on the excessive proportion of the general mass of blood, since it takes place in the feeble, in whom this fluid is not abundant. When once developed in one organ, it tends to establish itself in the capillaries of others; and as the capillary circulation in general becomes disordered, one of two phenomena may take place. First, either the Hyperemia proceeds to be repeated incessantly; or, secondly, while it is fixed upon one or two organs, others, in consequence of the attempt at equilibrium between the powers of the capillaries, receive less blood than usual, and fall into a state of *anæmia*. The nature of these two circumstances, upon the occurrence of which the author places much stress, are illustrated by the phenomena of sundry diseases.

It is chiefly upon organs already diseased, or at least not absolutely healthy, that M. Andral represents the hyperemic state to be liable to be repeated; and in this manner he explains, in the course of congestion of any part, the occurrence of secondary and variable phenomena, as palpitations, dyspnœa, or hæmoptysis, symptoms of *gastritis*, *hæmaturia*, or uterine hemorrhages. Even if this disposition to hyperemic repetition be not induced by previous morbid states, accurate observation may recognize a scale of various degrees of susceptibility in different organs. Those most susceptible in this point of view are the nervous centres, the subdiaphragmatic portion of the digestive canal, the lung, the heart, and the skin. In other organs again, hyperemy does not take place, unless from the primary congestion of some organ in particular ; and of this the tongue is adduced as an example, in which, though idiopathic hyperemy may occur, the sympathetic form takes place only when the stomach is diseased.

During chronic diseases, organs more or less remote from that which was the original seat of morbid action, are liable to become disordered ; and though these instances of secondary *Hyperemia*, like the primary one, may be chronic in their origin, and latent or obscure in their course, they contribute not less powerfully to the destruction of the patient. Occasionally, indeed, they assume all at once an acute form ; and sometimes after remaining chronic they become acute, and thus constitute a frequent cause of the premature death of patients labouring under any chronic disorder. The lungs and the digestive canal are the two parts in which, in all chronic diseases, hyperemy is most liable to be established in the secondary manner. In such circumstances three results may take place. Either the primary hyperemy is in no degree modified—the most frequent ; or it may be aggravated by reason of the reaction of the organ newly hyperemiated ; or the primary hyperemy may cease at the developement of the secondary,—which seems to correspond with the metastasis of the older pathologists.

From the experiments of Wilson Philip and Hastings in this country, and Gendrin in France, he shows that we must distinguish several degrees of this morbid state, according to the condition of the blood and vessels of the affected part. The first degree of *hyperemia* is that in which the vessels are contracted, and consequently in which the velocity of the motion of the blood is augmented, either because the vessels act on the fluid more energetically, or in consequence of the operation of the hydrodynamic law, that the motion of liquids flowing from tubes of larger into those of smaller diameters is accelerated. In the second degree of *hyperemia*, the vessels are dilated, the motion of the blood is retarded, the atoms mutually approximate, and there is a tendency to coagulation. In consequence of the condensed and accumulated state of the mass of blood, the hyperemiated part then presents at first an intense red colour, and, as the retardation continues to augment, a brown tint. Lastly, the third degree of hyperemia is made to consist in complete stagnation, when the colour of the part acquires a deeper brown, till at length it becomes quite black.

M. Andral further has recourse to the experiments of Hunter to prove that stagnation and the deep black colour of the blood are intimately connected; and, combining these with the circumstances in which the slaty, brown, or black colour is observed, he infers that the motion of the blood is retarded or arrested in two extreme cases only, that of super-acute hyperemia and chronic hyperemia of long duration. In the first, the complete stagnation, M. Andral revives an opinion of Boerhaave, and represents it as causing death of the part or gangrene.

On the question by what powers the vessels originally contracted become afterwards dilated, we find several conjectures, but nothing certain. Upon the whole of this subject, indeed, the author rather gives way to his fancy than exercises his judgment, amuses the reader with various distinctions and speculative inquiries, and seems to forget entirely that he ought to be describing matters of fact. Plethora, under the name of *Polyemia* (πολυς ἁιμα) receives some attention; but all that is said consists of the opinions of the older pathologists reproduced in new language. After enumerating the effects of plethora on the brain, on the heart, and on the mucous surfaces, *innervation*, M. Andral informs us, becomes disordered by the unusual quantity of blood in the cerebral capillaries, hemorrhages take place from the mucous surfaces, and serous or dropsical effusions, *active* and *passive*, may take place from the serous membranes.

Still more dismal is the *hypothesis*, we cannot call it *theory*, of fever and inflammation. When, in consequence of general hyperemia, every solid atom of the body is overstimulated by the excessive quantity of blood, the connecting sympathies of the different diseases M. Andral represents as becoming more active, and causing their tissues to exert an unwonted reaction. At this conjuncture innervation may be disturbed, the temperature of the skin may rise, the pulse may be quickened and increased in strength, the secretions may be variously modified, and *fever may be kindled*, lasting one or several days. If accompanied with no formidable symptom, it constitutes either the *simple continued fever* of authors, or *inflammatory* fever. In other circumstances, the intensity of reaction exerted by the several organs is represented to be capable of producing more violent effects. Various nervous phenomena, sudden oppression of the powers, and unreal adynamy may take place. Lastly, it often happens, says M. Andral, that one organ becoming more particularly affected, the disease which was *general* becomes *local*. In the first case he represents the symptoms as capable of amendment and final extinction, under the influence of diet and blood-lettings used to diminish the excessive quantity of blood. In the second case, inspection of bodies generally unfolds in one or more organs distinct *phlegmasia*, which, however, he thinks is posterior in origin to the attack of febrile commotion. In other instances simple accumulations of blood in the capillaries of the different organs without change of texture, only are recognized; and then death, he infers, must have taken place without genuine *inflammation* in any organ.

Absolutely this is too much. Is it possible that M. Andral can be so dull as to substitute ideal modes of explaining phenomena for the arranged facts of a descriptive science? We have looked with the most careful attention for anything which is entitled to the name of *precise*, *accurate*, or matter of fact; and we assert, that, of the whole of this discussion on sthenic hyperemy, the only features making any approach to this character are now before our readers.

To proceed, however, with *Asthenic Hyperemy*, M. Andral, first adopting the habitual violet tint of the lower part of the legs and upper surface of the feet in old persons as an effect of languid circulation, thinks that similar stagnation may take place in the last extremities of the arterial tree, that is, in the minute or capillary arteries; the blood may be coagulated and obliterate the cavity of the vessels; and as it is in this state no longer fit to continue life, mortification of the part follows. These phenomena, successive or simultaneous, M. Andral regards as demonstrating the existence of *asthenic hyperemy*, which he also, not with very great consistency, admits, may occur as secondary to sthenic or active hyperemy. An example of this consecutive connection of these two varieties of hyperemy he finds in several of the disorders of the exterior mucous membranes, more especially the various stages of conjunctival inflammation. For an instance of hyperemy asthenic from the first, he has recourse to the livid *vibices* and patches of the buccal mucous membrane in persons labouring under scurvy, in whom he recognizes not only change of the blood, but diminution of the powers which move the blood in the different sets of capillary vessels.

To prove the existence of asthenic hyperemy in the internal organs, he adduces the instance of the lung in which, though very frequently the seat of different degrees of active hyperemy, congestions of an asthenic character also are often, he maintains, established. Of this kind are the bloody gorging of the pulmonic tissue, in most instances of mortal agony, in which, as in animals, after division of the pnuemogastric nerve, the lesion of innervation strikes with sudden debility the forces of the capillary vessels,—and the congestion which occasionally takes place in convalescents from acute pneumonia. Of the same nature also he regards the hyperemic congestion which takes place in persons who have been long confined to bed by tedious diseases, and in whose lungs may often be found a form of capillary congestion distinguished by M. Lerminier as that of position; and to the same cause he ascribes the habitual dyspnœa which takes place in exquisite cases of scurvy, and that which takes place in certain cases of pulmonary catarrh, the symptoms of which abate or disappear under the use of tonic or stimulating medicines.

Upon the whole, M. Andral infers, that every organ is liable to become the seat of two forms of hyperemy, *active* or *sthenic*, from irritation, and *passive or asthenic* from impaired tonicity of the capillaries. The former is one of the degrees of what is named *inflammation ;*—it is one of the elements of this complex process. The latter is entirely different, and approaches that state which has been long designated *asthenic inflammation*, which is only a contradiction in terms, since the one implies the opposite of the other.

Common sense and observation unsophisticated by the rules of schools would be inclined to say, that it is less a contradiction in terms than *sthenic inflammation.* Every disease must be a state of loss of power in one tissue or another; and it is not easy to see how inflammation is to be exempted from this general character. The greatest objection to this term is, that it is tautological; for it is impossible to conceive any form of inflammation not asthenic. In every form and variety of the disease, the powers of the capillaries are impaired. But whatever importance is to be attached to these distinctions, which in truth are somewhat idle, the most extraordinary circumstance is, that M. Andral should not perceive, that, by changing the name, he does not get rid of the objection, and that his own definition as much implies a contradiction in term as that of his antagonists. The similarity between the state of the capillaries in sthenic and in asthenic hyperemy he admits, and in some measure defends; yet he attempts to establish a distinction between them by tracing them to different causes. He tells us they both tend to the same point, and that the one may follow the other; and then, that we may not confound them, he states that the one is only a part or element of inflammation; while the other, though admitted to be a form of that process, is entirely different from it.

The nature of *Mechanical Hyperemy* may be understood from the definition already given; and it is unnecessary to say more of it, than merely to state that its causes are, 1. gravitation; 2. defective proportion in the relative capacity of the different cavities of the heart; 3. compression or obliteration of a venous trunk; and lastly, an impediment to the current of blood in one of the sets of capillaries connected with any venous trunk.

Of *Cadaveric* Hyperemy, which is also sufficiently understood by its name, two kinds are distinguished, one taking place at the moment of death, in consequence of the capillaries retaining their contractility after the heart has ceased to beat; the other occurring some time after death, in consequence either of *hypostasis*, that is, accumulation towards the most dependent parts of the body, of transudation, or of chemical affinities. The observations on this, which is entirely a pseudo-morbid process, and to which we have more than once taken occasion to direct the attention of our readers, it is unnecessary to repeat.

M. Andral then proceeds to give some general concluding observations on the different forms of hyperemy, and to apply them more particularly to the explanation of the phenomena of hemorrhagy. This he regards as a form of sthenic hyperemy, and after perplexing himself to determine why in one form the blood remains in the vessels, and in the other it oozes from them, digests the whole of his speculations into six paragraphs, on the similitude and differences between inflammation and hemorrhage, in which, however, the English reader is unable to recognize a single new fact, or a more precise and distinct view of those with which he is already acquainted.

Anæmia next comes under consideration in the second chapter of this section. Of this he makes two varieties, local and general anæmia, the first confined to one organ, the second extending over the capillary system at large, and consequently affecting every organ of the body to a greater or less extent, and constituting what M. Andral proposes to distinguish as *Hypemia* (ὑπο ἁιμα) or a state of paucity of blood.

The circumstances favourable to the production of local anæmia are referred to the following heads. 1*st*, diminute of the calibre of the artery proceeding to the anemiated organ; 2*d*, modifications of innervation, which he argues may have the effect of diminishing the supply of blood, and blanching the part or parts; 3*d*, local hyperemy, which in the matter of derivation, or by a species of metastatic action, gives the blood an impulse from certain textures to others; 4*th*, a state previous to that of hyperemy; and 5*th*, *anemia*, without appreciable cause, though visible in the dead subject.

On the subject of general *anæmia* or bloodlessness, after three pages of vague conjectures and speculations, M. Andral quotes the well-known case of the workmen of the coal-pit of Auzain, not from the *Journal de Medecine* of Corvisart, the work in which Professor Hallé originally published it, but from the recent Dictionary of Medicine by MM. Adelon, Andral, Beclard,

&c. As our readers are well aware that the original paper was republished in this Journal shortly after its appearance on the Continent, it is superfluous to dwell longer on the subject. We may take this opportunity of remarking, that if the reading of M. Andral could not supply him with the excellent illustration of that paper furnished by Dr James Combe of Leith in the first volume of the Edinburgh Medico-Chirurgical Transactions, he might at least have taken the trouble of consulting the pages of the Parisian Journal in which the communication first appeared.

Lesions of nutrition, which form the subject of the second section, are divided by M. Andral into four general heads, according as the constituent atoms of the textures are modified, 1*st*, in arrangement, 2*d*, in number, 3*d*, in consistence, and 4*th*, in intimate nature.

In the first chapter, devoted to the subject of malformations or monstrosities, M. Andral, though beset as usual with his love of preliminary general reflection and speculation, gives, however, on the origin of these derangements views more useful and more entitled to commendation than on the subject of the last section. To explain the origin of the first kind of malformation, those which depend on imperfect developement, he traces the growth of the parts of the fœtus as elucidated by the researches of Wolff, Oken, Meckel, and others. The growth or developement of the intestinal canal, for instance from the *vesicula umbilicalis*, is adduced to explain the fact, that in all the recorded examples of malformation of this tube, its primordial portion, or the lower part of the ileum, is never wanting, while, either from interruption given to its downward or upward developement, the colon, entire or in part, or the upper part of the ileum, or the stomach, may be wanting. The constant presence of the urinary bladder is in like manner referred to its early connection with the continuation of the allantoid membrane. The case in which Fleischmann found no trace of urinary apparatus he does not attempt to explain.

After some general and rather vague observations on the early period at which the nervous and vascular systems are developed, he brings forward the views of M. Serres, who, our readers are aware, ascribes defective developement of the former to previous defective developement of the latter order of textures.* He nevertheless does not omit the influence which the *parietes* of cavities appear to possess in expediting, retarding, or arresting the developement of the contained organs; thinks that this doctrine is particularly applicable to the cranium and spine, with the brain and spinal chord respectively;

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* Medical and Surgical Journal, Vol. xxv. p. 442 and 443.

and to give his views greater stability, avails himself of the proofs derived by M. Geoffroy St-Hilaire from the structure of certain monsters in the lower animals to establish the principle;—that the bones which enclose the brain, undergo in developement alterations directly proportioned to the alterations of the brain itself, the greatest imperfections of the latter organ being attended with very great imperfections, and sometimes total want of the former. Upon this principle he distinguishes the anencephalous and the acephalous monsters into several species. In three of the former are placed the *coccycephalous* or bill-head, the *cryptocephalus*, or invisible head, and the *anencephalus*, or brainless head. In the latter are placed the *cysticephalus*, or vesicular brain, and the *derencephalus* or neck-brain. Of these the common character is, that there is a simultaneous imperfection of the developement of the brain and its bony case. But as there are instances in which the brain is well formed and of good size while the bones are incomplete, this law of M. Geoffroy St-Hilaire is not universal; and it is more rational to infer, that the defect of formation of the bones and of the brain proceed from some more general cause, which may operate occasionally with greater effects on the one than on the other.

To the same head of defective or rather interrupted developement belong the instances of clefts or fissures, accidental openings, or separations of parts which are in the natural state conjoined. They are all upon the median line; and this circumstance at once refers their formation to that period of the fœtal existence, when the parts which are formed of symmetrical pieces on each side are still separate, and when, as has been shown by M. Serres, they are formed from the circumference towards the centre. The examples of this variety of malformation are so common and familiar that we shall not dwell on them.

To one modification of interrupted developement,—defect of reunion of the *parietes* of cavities,—M. Andral ascribes many congenital vices of position, for instance, when the organs of the head, chest, or belly, are found out of their proper cavities, the fœtal position of organs continued after birth, for instance, the testicles in the abdomen, and even such aberration of the formative *nisus* as the immediate attachment of the hands or feet to the scapula, or ilio-ischial bone respectively, from non-developement of the bones of the arm and leg. Those malformations, which consist in want of openings or natural cavities, known under the general epithet of *Atresia* or imperforation, are also ascribed to interrupted developement of the tissues composing the openings; and next to this is placed the preternatural adhesion or coalescence of parts denominated by Breschet

Symphysia, well exemplified in the union of the two eyes—a deformity described under the different names of *Cyclopia*, *Monopsia*, and *Rhinencephalia*, according to the idea most forcibly impressed on the observer.

A more interesting department still of the subject of malformation is when M. Andral enters upon the examination of an inference which has resulted from the recent researches of anatomists,—that the different malformations which result from interrupted developement represent with more or less accuracy the normal structure of the lower animals. To this subject we took occasion lately to advert as one of those upon which extensive study of the structure of animal bodies in general alone can give us accurate information.* This singular fact is indeed the result of the law of organogenesy, in consequence of which the human fœtus passes through the several stages of organization which are the permanent structure of animals placed beneath him in the animal scale. Thus the want of several or all the members is the natural structure of the *cetacea* among mammiferous animals, and of several fishes and reptiles. The heart, elongated into a single vessel, forms the dorsal vessels of insects. Forming a muscular sac with one cavity it represents the single heart of the *crustacea*. Consisting of two cavities it resembles the heart of the fishes, and of many *mollusca*. With two auricles and one ventricle it is the heart of the frog-family; and with this single ventricle parted into two cavities by an incomplete partition, it is the heart of the turtle tribe. In some monsters the pulmonary artery, as in the frogs, is only a branch of the aorta; and in others the latter vessel communicates with the former, as in the turtles, by means of a canal. Most of the points of resemblance between the nervous system of lower animals and the human fœtus or the human monster, we had occasion to notice in our account of the researches of Tiedemann on the developement of the fœtal brain; and we therefore omit the proofs of this given by Andral from the researches of Desmoulins and Serres. The lobulated kidney of the fœtus—occasionally continued to adult life, is the natural structure of many reptiles, fishes, and even mammiferous animals. The cloaca or common termination of the bladder and rectum, distinguished as malformation in the adult and in mammiferous animals, actually exists some months before birth, and is the natural structure of birds and reptiles.

The second great source of malformation, excess of developement, may produce an increase either in the number or in the volume of the organs. The latter, though the cause of monstrosity, is less important and interesting than the former, in so far as the excessive bulk of parts may also be the result of disease. The former is attended with doubling only of the organs, and has been well investigated and illustrated by Meckel, who proposes to distinguish it as the monstrous *duplication* of organs.* In many cases the duplication is so complete, that it is highly probable that it results from the accidental conjunction of the parts of two fœtuses. One modification of this malformation is particularly noticed from Steglehner, a German author, who, in a dissertation on Hermaphrodism, enumerates under this head those instances in which in the same individual were found supernumerary organs belonging to different sexes. This, however, admits of explanation in the same manner. We regret that our limits will not allow us to enter more at large into this point, which has been a matter of interest from the time of Ingrassias, Parey, Schenke, Mercurialis, and Blasius, to that of Meckel, Beclard, and Breschet; and we refer our readers to the pages of M. Andral, and to those of Meckel himself.

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* Vol. xxxi. p. 412.

Perversion of developement is a third source of malformation; and it gives rise to a very great variety of errors, especially in the position and arrangement of parts. The transposition of the viscera of the chest and abdomen is the best and most distinct example of its effects; and M. Andral is desirous to explain it by admitting an aberration in the primitive formation of the organs—which is only stating the fact in other terms. To the same head are to be referred the numerous anomalies in the origin and distribution of arteries and veins—which were first well described by Allan Burns, and which have since been very fully enumerated by Meckel and by Tiedemann. These anomalies are observed chiefly in the number of the small trunks, which is oftener increased than diminished. The increased number may depend on the right subclavian artery arising directly from the aorta, or on this latter vessel giving small branches which do not usually rise from it, for instance, the vertebral, the inferior thyroid, or the internal mammary. The diminished number of trunks furnished by the arch of the aorta is the result of the unusual reunion of two arteries,—either the left carotid becoming a branch of the *innominata*, or rising from a common trunk with the left subclavian, or one trunk furnishing the two carotids, and another the two subclavians, or lastly, the right subclavian rising alone at its usual place, and another trunk producing at once the left subclavian and the two carotids.

In the second chapter, on the lesions resulting from changes in the number of constituent atoms, we find hypertrophy, atrophy, and ulceration discussed.

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* J. F. Meckel De Duplicitate Monstrosâ Commentarius. Folio. Halae. 1815.

In the first article on hypertrophy, instead of giving the reader at once a distinct and intelligible idea of that change, after sundry reflections on the mode of studying its nature, he details a case apparently of enlarged leg, in order to demonstrate the structure of the skin according to the method of M. Gautier and M. Dutrochet. Then follow hypertrophy of the fibrous tissues, of cartilage, of bone, of nerve, of muscle and its varieties, of capillary vessels, or what we call *developement* of the *erectile tissue* or *aneurism* by *anastomosis*, and the modifications and complications of hypertrophy,—followed by a long speculation on its causes. Atrophy is discussed more briefly, and is ascribed to one or other of five causes, 1. diminished supply of blood; 2. diminished *nervous influx*; 3. suspension or diminished energy in the functions of an organ; 4. imperfect hematosis from chronic disease of the lungs or other elaborating organs; and 5. irritation. Ulceration is in like manner discussed with brevity; but as the observations of the author convey no new information to the English pathologist, and as the process is improperly placed in not being regarded as an effect of inflammation, we pass to the third chapter.

Here, after some general observations on changes in consistence, the author defines induration as an increase of the consistence of tissues without change of structure—indicated by the grating sound of the knife during incision. It is distinguished into two species, according as it is produced by a modification in the nutrition of the solid atoms of the tissues, or by change either in quantity or quality of the liquids deposited into their substance. These again are subdivided first according to their supposed causes, and then according to their volume and the shades of colour which attend them; but the distinctions are too refined for attention in this place. Then follows a long inquiry on its causes, the general result of which is, that induration is the effect of irritation.

Softening is next brought under review; and after a deliberate examination of the tissues and organs in which it occurs, he distinguishes it into different degrees, and three species,—the first without change of colour, the second with discoloration, and a third with redness of the tissues. Its causes he thinks it impossible, in the present state of knowledge, to determine. Though it is often the result of the process of irritation, it may be established that many textures lose their natural consistence under circumstances which preclude every idea of this process. He is disposed, however, to view it as an aberration of nutrition, resulting from the *diminished aggregation* of the constituent atoms. Occasionally it is cadaveric or taking place only after death; and of this M. Andral distinguishes three causes,—1*st*, the diminished cohesion, which all the textures undergo when no longer under the influence of vital action,—the effects of chemical decomposition in short; 2*d*, imbibition of a liquid either effused or within vessels, which tends to produce maceration; and 3*d*, the action of corrosive poisons continued after death by fluids effused.

The transformations or conversions, which form the subject of the fourth chapter of this section, receive a long and elaborate investigation in the following order;—cellular, serous, mucous, cutaneous, fibrous, cartilaginous, and osseous transformations. The change is said to consist in the constituent atoms of any tissue undergoing such a change of nature as to constitute a tissue entirely different. They form, indeed, what are better known under the name of accidental developements of new tissues in organs not proper to them, degenerations according to some authors, and conversions according to others. Of its causes nothing satisfactory is stated. For though M. Andral admits that it is often preceded by irritation and congestion of blood in the texture, he contends that it is so neither uniformly nor necessarily; and he thinks the knowledge of the laws of embryogeny, and of those which regulate the nutrition of organized bodies in general, justifies the possibility of every kind of transformation, without previous stimulus or irritation.

In the third section, on the lesions of secretion, M. Andral first distinguishes these disorders into two great departments of *augmented* or *excessive secretion*, which he terms *Hypercrinia*, (ὑπερ over, and κρινω I separate,) and *diminished* or *suppressed secretion*, which is denominated *Acrinia*, (a privative and κρινω.) With much propriety, however, the first only is investigated, as on the second facts, he admits, are deficient. These disorders are afterwards distinguished according as they err in situation or form of lesion, which he designates by the general appellation of *Heterocrinia*, and which he complains much has been little studied. Thirdly, disorders of secretion are distinguished according to changes in their qualities; and to this head M. Andral refers all the morbid secretions and new products which are the result of disease.

Hypercrinia, or excessive secretion, is of two kinds, as the fluid secreted is retained or expelled from the body. The first case comprehends the dropsies, which are ascribed to five orders of causes; 1. stimulation of the serous membranes or the cellular tissue; 2. disappearance of a dropsy already established; 3. suppressed secretions; 4. changes of the blood; and, 5. impediment to the venous circulation. The second comprehends *fluxes*, or discharges, chiefly from the mucous surfaces, passive hemorrhages, catarrhal discharges, and serous discharges from the mucous membranes, or organs connected with them.

Heterocrinia is exemplified by the matter of one secretion being found in another, for instance milk, or one of its principles in urine, bile, or cholesterine in the fluid of dropsy or hydrocele, or in the substance of an organ; and, lastly, by the principles of a secretion being discharged by various outlets different from the proper one, as occurred in the case of *Paruria*, published in the New England Journal for 1825, and which is quoted in an abridged form by M. Andral.

The third chapter, on modifications in the quality of the secretions, presents a long and elaborate, but by no means distinct, view of the new secretions and morbid products which may be generated in the tissues and organs of the animal body. Their formation in these tissues is represented to be accompanied with one or other of the following states, 1. health; 2. active hyperemy; 3. modification in the consistence of the atoms of the surrounding tissue; 4. modification in the number of atoms of the surrounding tissue; 5. purulent secretion. In attempting to explain the origin of these accidental productions, the reader is once more overwhelmed with an endless discussion of the various opinions which have been promulgated, and speculations and interrogatories as to which is entitled to regard. Increased vitality and irritation, then, receive a portion of the author's attention; but as he discovers that neither of these states is essentially requisite, the full homage of his worship is reserved for nutrition or secretion, of which he regards this as an aberration. The products of morbid secretion he then divides into two classes, according as they are void of, or present characters of organization. The following table exhibits this mode of arrangement:

1st Class.		1st genus, albuminous matters,	pus, tubercle,
		2d genus, jelly-like matters,	the colloid matter of Laennec,
		3d genus, adipose matters,	
		4th genus, saline matters,	
		5th genus, colouring matters,	melanosis, black matter, cirronosis, yellow matter of Lobstein.
2d Class.	1st order objects the life of which is common with that of the body.	1st genus, organizable matter deposited at the surface of organs. Fibrine, *(albumen ?)* constituting false membrane.	
		2d genus, organizable matter deposited in the substance of organs, assumes various forms.	presumed fibrine, scirrhus, simple sarcoma, fleshy sarcoma, vascular sarcoma, medullary, encephaloid, fungus hematodes.
	2d Order.	Organized products with independent life.	Entozoa—or living animals,—worms, hydatids, &c.

The discussion on the nature and origin of tubercles, though long and rather dull, is upon the whole instructive. Upon the origin of these bodies, the author thinks that the circumstance of their being occasionally found associated with transparent vesicles is an accidental complication, and not adequate to prove that the hydatid is the nascent form of the tubercle. He rejects the account of Laennec, however, as to the first origin of tubercle, which he says is not invariably a greyish semitransparent granulation, but a yellowish, opaque, friable, round body, without trace of organic structure, and eventually undergoing the purulent or the cretaceous transformation. According to a recent analysis of pulmonary tubercles by Thenard, 100 parts gave 98.15 of animal matter, and 1.85 of saline matters, whereas tubercles which had undergone the chalky conversion furnished 3 parts only of animal matter and 96 of saline matter in the 100. After demonstrating from the researches of Louis and Lombard, the comparative frequency with which different textures become tuberculated, and their relative frequency at different periods of life, M. Andral takes a view of our information as to the occurrence of tubercular growths in the bodies of the lower animals, with the view of illustrating the circumstances under which they are liable to be generated. Upon this point, however, he arrives at no accurate conclusion. Though tubercles may appear in connection with irritation, they are, on the contrary, often produced without appreciable degree of this circumstance.

The account of the characters of melanosis is long, full, and not void of interest. That on cirronosis, which consists in gold-yellow staining as it were of the serous membranes, the spinal chord, and the great sympathetic, is a mere notice.

Among the subjects of the second class, after an account of that of the deposition of organizable matter at the natural surfaces, M. Andral gives a short sketch of those deposited in the substance of organs, and the chapter is closed by a brief view of the circumstances of the history and classification of the entozootic animals, which are arranged chiefly after the manner of Rudolphi.

In a fourth chapter the author considers the gaseous secretions which are the product of disease.

Of the two last sections, we have only to say, that the first, on the lesions of the blood, is long, and gives a tolerable view of the morbid conditions to which this fluid is liable or supposed to be liable; and that the second, on disorders of the innervation, is short for the best of reasons, that it really and truly contains nothing entitled to the character of being either new or instructive.

Here then, at the close of volume first, we must for the present suspend our observations on the work of M. Andral. The foregoing sketch will communicate to our readers some notion of its general merits. It is our impression, that, so far as we have gone, the work is a melancholy example of failure, where success might have been almost certain. The materials we have admitted are good; at least they are sufficiently so to have made from them a much superior work. The arrangement is decidedly faulty; a circumstance which we ascribe to the unhappy choice of a physiological basis. Whatever may be the advantages of physiological methods for physiological or even medical subjects, they are either essentially bad, and fundamentally inapplicable to the purpose of the pathologist, or we yet have to look for the rise of some genius whose talents may triumph over their inherent difficulties, and make the reader forget the awkwardness and incongruity, the jarring and imperfection of the several parts, in the general effect of the whole.

In the work of M. Andral two grievous errors are committed. The first is in attempting to assign positively to aberrations of certain functions or living processes, the nature of which is very imperfectly known, and must remain long obscure, morbid actions, changes, and products, on the nature of which little is known with certainty, and which, so far as they are known, may be ascribed with equal justice to other functions. What useful information does the pathological student obtain by being told that ulceration is a lesion of nutrition, from variation in the number of atoms of which textures consist? or that purulent matter and coagulable lymph, which he is taught from the first to regard as the product of inflammation or sthenic hyperemy, as M. Andral terms it, depend on a modification of the quality of the secretions? What advantage can accrue from learning, that, if one organ is converted into fibrous or fibro-cartilaginous matter, it is to be referred to one head, and if it be converted into *scirrhus* or *sarcoma*, it is to be placed under another? The effect of this is, that throughout the volume the reader is bewildered by the most extraordinary conjectures and hypothetical doctrines, and feels that instead of obtaining accurate information on matters of fact, he is compelled to listen to opinion after opinion, and speculative interrogatories without number.

The second mistake with which this work is chargeable is, that the author fixes on a function, and actually compels himself and reader to follow this function or living process, through innumerable hypothetical assumptions, *per tot discrimina verborum*, to a diseased action and its products; and very often it is utterly impossible to recognize the point from which they departed, or the connection between the two extremities of the route. It is needless to ask how much better would it have been to take the morbid changes as disclosed by dissection as matters of fact, and trace them upwards as far as they were cognizable accurately towards the first step of morbid action? Anatomy is a science of description, or classification of ascertained facts; and such ought morbid anatomy to be. In the hands of M. Andral she divests herself of this modest and unassuming vesture, and becomes embellished and decorated with so many adventitious ornaments, and so much loose fanciful drapery, that it is impossible for her to be recognized by her best friends.

ART. X.—*Report of the Select Committee appointed by the House of Commons to inquire into the manner of obtaining Subjects for Dissection in the Schools of Anatomy, and into the state of the law affecting the persons employed in obtaining or dissecting Bodies.*

A Bill for preventing the unlawful disinterment of Human Bodies, and for regulating Schools of Anatomy.

A Letter to the Right Honourable the Secretary of State for the Home Department, containing remarks on the Report of the Select Committee of the House of Commons, on Anatomy, and pointing out the means by which the science may be cultivated with advantage and safety to the public. By G. J. GUTHRIE, F. R. S. Professor of Anatomy and Surgery to the Royal College of Surgeons; Surgeon to the Westminster Hospital, &c. &c. London 1829. Pp. 37.

WE have hitherto been withheld from noticing the labours of Mr. Warburton and the Anatomical Committee of the House of Commons, because we had good reason to know, that they were in constant communication with the various medical institutions of the country, whose officers were fully competent to state the wants of our profession, and to suggest how they were most easily to be supplied; and we therefore conceived, that in the subsequent framing of the bill, the respective necessities and peculiarities of the several British schools of medicine would be impartially regarded. We believe it was the general expectation, and a very natural expectation surely, that, before the bill should go through all it stages in the House of Commons, an opportunity was to be afforded to these schools of satisfying themselves that their interests had been attended to, and of directing the attention of the legislature to any material omissions. Had this opportunity been afforded, it is not improbable that a part of the opposition it has experienced in the House of Lords would have been avoided. But as matters were conducted, the bill was hurried through all its stages in the Lower House with such haste, that the Scottish Schools of medicine could not express either privately or publicly to any of its members their opinion as to the efficacy of the provisions of the bill, nor receive an explanation of those articles which they considered defective or injurious; and in consequence, under the dread of the same fatal expedition being observed in the House of Lords, several of our medical institutions were led at once to oppose it publicly with all their might. This is the obvious explanation of a step, which, we have been given to understand, has excited no small surprise and even dissatisfaction in some influential members of the legislature, who have been most forward in promoting what they imagined were the interests of medical science and education. The postponement of the bill in its passage through the Upper House will put it in the power of every party concerned to state their views of its practical usefulness; but it is greatly to be feared that this has been gained only at the risk of the measure being ultimately lost altogether.

It is not our intention to discuss the entire subject of the anatomical report, and of the bill that has grown out of it. Most of the topics which they comprehend have already been made the subject of comment in so many quarters, that the reader will doubtless be happy to be spared their repetition in the present place. The chief object of this short notice is to point out what the Scottish Medical Colleges have considered, and what in our eye certainly appears to be, an almost total and unaccountable neglect of the peculiar situation of the Scottish Schools of medicine, and especially of that of Edinburgh.

The provisions of the bill are in general terms the following. Heavy penalties are to be inflicted on those who disinter bodies, or who receive bodies without certificates bearing that they have been procured from one or other of the quarters legalized by the bill. All unclaimed bodies in prisons, hospitals, or work-houses, may be delivered up for dissection; but the delivery is optional with the managers or overseers of each charity; and great latitude is allowed to claimants, since any person may claim a body who is willing to be at the expence of burying it, and who, there is sufficient reason to believe, really intends to bury it. Persons may bequeath their bodies for dissection, and such bodies, under certain conditions, are to be delivered up for that purpose. All teachers of anatomy must take out an annual license at the expence of five pounds; and a licensing board, of not fewer than seven persons, is to be appointed by the Secretary of State, to hold its meetings in London; a medical man may dissect a body, though not in a licensed dissecting-room, on procuring a special license, the expence of which is two pounds. After dissection, bodies must be buried with the observances peculiar to the religious creed of the deceased, or to the part of the empire where the burial takes place. Ireland is not to be included in the act.

All the clauses of the bill are subservient to the two great clauses which legalize the dissection of unclaimed bodies, and require anatomical teachers to take out licenses annually. It is to these two points that we shall chiefly confine our attention. If they will accomplish their object, all the other particulars are of very minor consideration, and, we doubt not, will meet with little or no opposition any where.

The system of licensing certain trades has been productive in various departments of so much abuse, that we must say we look with great jealousy on its introduction into the teaching department of a liberal profession. At the same time there is reason to fear that it is in the present instance a necessary evil; and all, therefore, which remains to be considered is, how it may be so contrived as to be least productive of hardship to existing teachers of respectability, and least liable to thwart the efforts of rising talent.

One manifest object of the licensing system is to diminish the number of teachers; for a choice of a certain number among applicants appears to be pointed out by the measures taken to insure impartiality. It is proposed that a majority of the commissioners shall be persons not belonging to any of the three departments of the medical profession. Now we must be allowed to hint that the object of this clause, if it is to be attempted in such a manner at all, can hardly be attained without advancing a step farther still, and excluding medical men from the board altogether. We have lately had ample opportunities of witnessing the baneful effects of a minority of medical men on the deliberations of public bodies respecting medical affairs. The minority can hardly fail sooner or later to govern the majority, because the medical members will naturally be led to pay most attention to the affairs of the commissioners, and the extra-professional members, seeing others paying that attention, will naturally be apt to neglect their part of the duty and rely on their medical colleagues.

We are at a loss to discover a feasible reason,—except the paltry one arising out of the saving of a few hundred pounds,—why there should be only one central licensing board held at London. The trouble and expence to which the teachers of

Scotland will thus be subjected will be comparatively much greater than falls to the lot of the London anatomists. Independently of the time which must be consumed in communicating with a body at so great a distance, he makes his application where his character and qualifications cannot be thoroughly appreciated; and of course he must apply through the medium of a London solicitor.

The project of restricting the number of anatomical teachers is one of dubious tendency. The object is to facilitate the supply of bodies; but unless enforced with discretion and kindness, (which we confess we have not the slightest expectation of finding in a licensing board), it must prove a serious obstruction to every attempt on the part of rising men of talent to distinguish themselves in the favourite department of anatomical teaching. Some of the professors of this university, in a representation sent not long ago to the members of the House of Commons, and which was published in the Medical Gazette, have proposed that in Edinburgh the number of teachers should not be more than two, or at all events three, the professor of anatomy being one. In this opinion, however, we believe they are not supported by the generality of their colleagues. Three, or even only two established teachers, are, we dare say, quite sufficient to instruct the medical youth of this school and to keep up the advantages resulting from rivalry. But how under this arrangement will young men be able to make themselves known, and to become teachers worthy of filling the place of their seniors who retire from office. The proposers of this scheme suggest, that, for the reason now mentioned, lecturers might be licensed, with the right of procuring bodies for that purpose, but not of keeping dissecting-rooms;—a suggestion, however, which surely is made in ignorance of the manner in which most successful teachers have arrived at popularity. Some have begun their career as demonstrators or practical teachers only; none, so far as we are aware, have ever attempted at the outset to deliver a course of lectures without conjoining practical teaching with it; and it is obviously impracticable to do so with success; for, under increased facilities of dissecting, almost all students who attend lectures on anatomy will also frequent the dissecting-room, and very few will ever think of prosecuting the two departments under different teachers. We should regret deeply, and we are sure those who have suggested the plan above-mentioned would equally regret, if any obstruction were raised by the bill to check the enterprize of aspiring talent. In no profession, perhaps, is the road to preferment opened more impartially or at an earlier period of life than in that of medicine; and there are many living instances of the fact, that no branch of medicine opens the way more surely than the teaching of anatomy. It is earnestly to be hoped, then, that it may be allowed to continue a field open to the ambition of every adventurer.

The only other clause in the bill which appears to us to call for particular notice is that which legalizes the appropriation of the unclaimed bodies of those who die in prisons, hospitals, or work-houses.

Here we cannot help expressing our astonishment at the reception which this clause met with in the House of Lords. The necessity of providing in one way or another the means of dissection is universally felt, wherever the dictates of reason and common sense are listened to. Consequently, every person who has delivered his sentiments on the subject, in or out of Parliament, has avowed his hearty concurrence with the determination currently expressed to provide those means. Yet when it is satisfactorily proved that the assignment of unclaimed bodies not only will accomplish the end in view, but is likewise the only mode in which it can be accomplished, not a few of these well-wishers to the cause of anatomy at once declare they have insuperable objections to such a measure, and conclude, nevertheless, by gravely repeating their conviction, that the wants of the anatomical student must be supplied. It can serve no useful purpose to conceal the fact, that from no other source or combination of sources is it possible to derive the fourth or even tenth part of the supply which is required. The question, in fact, which the persons alluded to will have to settle is nothing else than a choice between several evils. And at present the question fairly is,—whether it is better, that, as at present, the feelings of every class in society shall be constantly liable to the risk of being outraged by the violation of the sepulchres of their dearest relatives, and by the perpetration of such atrocious crimes as those which have been lately brought to light,—or that, as the Bill projects, the feelings of those, of whom some burden, and others prey upon society, shall, to save such outrage, be annoyed with the prospect of being subjected after death to the knife of the anatomist. We have no disposition to enter into the merits of the question. We shall merely remind those who will hereafter have to decide it for themselves, that it is *not the dissection of one's own body, but the dissection of relatives*, which is the great object of abhorrence in the ignorant, as well as in the enlightened walks of society. There are many, very many persons, even in the lower ranks, to whom the prospect of the dissection of their own remains would be a matter of indifference, but who never would consent to the bodies of their relations being so disposed of. This we have had frequent opportunities of knowing; and we are quite satisfied that the feeling would become general, if the liability to dissection were general. The grand object, in short, is to save the feelings of living relatives, which, we are as thoroughly satisfied, will never in this country become different from what it is now. We confess, then, that we are disposed to consider as very much misplaced the humanity which has induced some peers and prelates to take up so warmly the part of the unclaimed bodies of the poor. At all events, we repeat, no other source of supply need for an instant be contemplated; and if that source is to be cut off, the interests of anatomy will be much better consulted without any legislative enactment at all,—nay, the science must practically become almost extinct by the conjunction of such legislative interference as is designed by the bill for annihilating the present mode of supply.

Conceiving, then, that the opponents of the measure will be eventually convinced, that the giving up of the unclaimed bodies of the poor is a necessary part of it, we proceed to observe, that the conditions under which it is proposed by Mr Warburton's Bill to surrender them, are such as will in all probability render this essential article nugatory, at least in Scotland. So much latitude is allowed to claimants, that any person whatever, though nowise related to the deceased, may claim his body, provided he is willing to defray the expences of the funeral, which here do not exceed sixteen shillings. It must be quite manifest that the purpose of the bill will in no long time be defeated, if not by other means, by the establishment of friendly societies for the purpose of burying the friendless poor. We cannot presume to dictate what limitation should be put to the power of claiming, in order to prevent this and similar difficulties; but some limit must obviously be assigned.

Neither do we approve of the clause which renders the giving up such unclaimed bodies merely permissive. The framers of the bill know little of the constitution of many of the public corporations who have the management of our hospitals and work-houses, if they did not foresee that they would be delighted to take part against the wishes of anatomists for the sake of a paltry popularity, and the love of exercising their little brief authority. Such is generally known to be the constitution of many of these corporations in London; and even in Edinburgh there are not wanting a few troublesome spirits of the kind, who, though they may not have it in their power to deny the request of the anatomist altogether, may nevertheless by their agitation bring his daily transactions so much under the eye of the public, as to render the procuring of bodies, during the first years of the operation of the bill, hardly less burdensome or odious than it is at present.

We come now to an important feature of the bill, in regard to the interests of the school of medicine in this city,—the want of a clause to legalize the transference of bodies from one part of the kingdom to the other. We are told, indeed, that such transference is not prohibited; but we must confess, that, considering the precision with which all manner of trafficking in dead bodies is regulated by the bill in other respects, it appears to us preferable, that their transference should be expressly legalized. Such a measure at all events, we beg it may be distinctly understood, is essential to the preservation of the Edinburgh Schools of medicine. It has been stated in the representation or remonstrance of the professors of our University, that the whole unclaimed bodies of all the hospitals, prisons, and charity workhouses in the city do not exceed 100 annually; and when allowance is made for those which are examined for pathological purposes, as is done at most of the said institutions, and likewise for the number of deaths which take place during the summer, when bodies are little, and during the autumn when they are not at all wanted, the annual average of disposable bodies under the conditions of the bill cannot exceed fifty. Now it has been stated in evidence by our College of Surgeons to the anatomical committee, that the number actually used in the sessional year 1827-8 was 150, and that this supply was quite inadequate;—which latter statement will easily receive credit, when it is considered that for several years past the number of medical students in Edinburgh has amounted to between 800 and 900. It is clear, therefore, that Edinburgh alone never can supply the means of dissection to her students. We likewise fear, that, without some extension of the bill in regard to disposable bodies, it is impossible to procure any material addition from other parts of Scotland, as the institutions which come under the denominations specified in the bill, are, except at Glasgow, scanty in number and small in extent. Whether it may be advisable, then, to include in the list of disposable bodies the unclaimed bodies of those who die while living on their respective parish funds, though not in work-houses, we shall not pretend to decide. But whether the additional supply is to be derived from that quarter, or from the excess of the supply in England, the right of transference from a distance becomes equally indispensable.

We conceive that in England, nay even in London, the supply will exceed the demand. This will not be the case, indeed, if any reliance is to placed in the opinion expressed in evidence before the Committee of the House of Commons by one or two very eminent surgeons in London. But we are sure we speak the sense of the profession generally, and of anatomical and surgical teachers in particular, when we insist that the estimate of these witnesses was most unnecessarily high. They appear to have spoken under the idea, that surgical operations are to be learned by the student by practising on the dead body. If so, their estimate of the number of bodies required was too low instead of too high; for if a facility of operating on the living body is to be acquired by a readiness in operating on the dead, it is not *twelve*, nor even twenty bodies that will suffice, because the operations must be frequently repeated. But in fact, except in regard to a few operations, which the student has ample opportunities of trying in the course of ordinary pathological inspections, we are quite satisfied that little or nothing is to be learned from practising on the dead body. We know it is the opinion of several practised teachers, who had themselves undergone a course of tuition in the manner alluded to, that operations on the living body are very little facilitated by such courses, and are to be learned, so far as anatomy goes, simply by dexterity in handling the knife, and above all by an exact knowledge of the relation of parts; both of which qualifications are to be acquired not certainly by mutilating dead bodies, but by the constant and careful practice of anatomical dissection. We can hardly think it possible for the pupil to dissect with any advantage more than the equivalent of a single body during each of two sessions and two during the third. If this opinion be correct, nay, if it even only approaches to the truth, it is plain that the students of London cannot advantageously use all the disposable bodies which the present bill would place within their command in London alone.

In the preceding remarks we have touched on some of the topics of the Letter of Mr Guthrie. Of this letter we have only room to say, that in many respects it is powerful and satisfactory, but here and there his arguments appear to us unnecessarily overstrained.

[*Addition to the Original Communications.*]

ART. XIII.—*Superior Maxillary Bone Excised.* By JAMES SYME, Esq. Surgeon of the Surgical Hospital, and Lecturer on Surgery in Edinburgh. [Addressed to one of the Editors.]

MY DEAR SIR,

YOU are aware that osteo-sarcoma of the upper jaw-bone is a complaint not very uncommon, and that its result has been hitherto uniformly fatal, whether the disease was allowed to follow its own course, or attempts were made to arrest it, by digging out the morbid growth. Surgery, in short, has not been more successful in this case than it was in regard to the same malady affecting the lower jaw, so long as its operations went no farther than the confines of the tumour. I need not remind you with what ease and certainty osteo-sarcomatous tumours of the lower jaw are now removed on a different principle, viz. cutting through the sound bone; and there can be little doubt that similar growths of the upper jaw would be removed with equal advantage, provided they could be extirpated by excision of the whole bone affected. Attempts have accordingly been made to accomplish this amputation of the superior maxilla, but have hitherto failed, chiefly owing to the uncontrollable hemorrhage which I have heard obliged one operator to desist even after he had tied both carotids. A case lately occurred, in which I overcame this difficulty; and as the plan of operation followed on the occasion in question seems to me such as renders the process very easy and safe, I think the readers of your Journal may consider it deserving of their attention.

William M'Donald, æt. 54, recommended by my friend Mr Davidson of Dundee, entered the Surgical Hospital on the 11th of May, on account of a large swelling of the left cheek. The tumour was about the size of a turkey's egg, firm, projecting, and circumscribed. It seemed to occupy all the maxillary bone, extending into the mouth, but not passing beyond the mesial plane of the palate, and reaching up to the lower edge of the orbit. It had existed ten months, and was rapidly increasing. In these circumstances Dr Ballingal and Mr Nasmyth agreed with me in thinking that the patient's speedy destruction was inevitable if the disease were left to itself; that an attempt to dig out the tumour would be inflicting pain without the smallest prospect of permanent benefit; and that the case was a very fair one for practising excision of the entire superior maxillary bone.

In the presence of the gentlemen above-mentioned, and the pupils attending the hospital, I proceeded to do so on Friday the 15th.

The patient being seated on a chair, I made a crucial incision by cutting from the zygoma to the angle of the mouth, and from the inner angle of the eye to the angle of the jaw. Having dissected back the flaps thus formed, so as to bring the external surface of the tumour completely into view, and tied the facial artery, together with two transverse facial branches of the temporal, I partially divided the malar bone with a saw, and completed its section by means of the cutting plyers. I then, partly by dissection, partly by pushing with the handle of the knife, separated the contents of the orbit from the floor of that cavity ; next placing one blade of the cutting-plyers in the nose, the other in the orbit, divided the nasal process of the maxillary bone, and cut through the hard palate in a similar way, having previously extracted one of the incisor teeth.

So far I had calculated that the operation would be nearly bloodless ; but to prevent troublesome hemorrhage in executing what remained, it seemed to me proper to get command of the internal maxillary artery. In order to do this, I made a small incision below the ear, and dissected through the parotid gland, so as to enable Dr Ballingall to compress the vessel between the point of his finger and the neck of the lower jaw. I then readily and fearlessly turned out the tumour ; and we were pleased to see that the artery was as effectually subjected as the femoral ever is by the best applied tourniquet. We were less pleased to observe that the morbid growth was not confined to the maxillary bone, but extended to the sphenoid, in the base of the skull.

Having done all that we proposed, and all that could be done, we determined to try nothing more. I therefore brought the edges of the cheek together by sutures, and sent the patient to bed. The blood lost was measured, and found to be 10 oz.

The patient suffered no constitutional disturbance, and was walking in the garden on the third day after the operation.

Though there is still no appearance of the disease recurring, there can be little doubt that the result will be no exception to the usual one of such cases ; but knowledge of the facts that the inferior maxillary bone may be completely excised—and that the hemorrhage of the internal maxillary artery may be effectually restrained by pressing the vessel at its origin upon the neck of the jaw—may be useful in future, by inducing surgeons to practise excision while the disease remains within accessible limits.

I remain, my dear Sir, very faithfully yours,

JAMES SYME.

75, *George Street*, 16*th June* 1829.

P. S.—I shall state the result of this case in the general Report of Cases treated in the Surgical Hospital, which I propose to transmit for publication in the next Number of your Journal.—J. S.

PART III.

MEDICAL INTELLIGENCE.

ANATOMY AND PHYSIOLOGY.

On the Capacity of the Lungs in the healthy and diseased state. (Archiv für Anatomie und Physiologie, No. 1. 1828.*)*—The statements of physiologists differ materially as to the mean capacity of the lungs. Passing over the earlier experimentalists, we find that, according to the experiments of *Jurin*, at each natural expiration 40 cubic inches are discharged, and by a violent expiration 220 inches:—That according to *Goodwin*, after a complete expiration 109 cubic inches on an average remain in the lungs, while a natural inspiration introduces only 14 inches more:—That *Menzies* procured for each natural inspiration 40 cubic inches, for each forced inspiration 200 inches:—That *Abernethy* estimates each natural inspiration no higher than 12 inches:—That *Kite* estimates a natural inspiration at 17 inches, a forcible inspiration after a forcible expiration at 200, and the air remaining in the lungs after a forcible expiration at 87 inches:—That *Jurine* admits 20 inches, and Delametherie only from 4 to 6 as the amount of a natural inspiration:—That according to *Sir H. Davy* 41 inches are contained in the chest after a forcible expiration, 118 after a natural expiration, 13 more after a natural inspiration, and 254 after a violent inspiration:—That according to *Bostock* 280 inches are contained after a natural expiration, 40 are added by a natural inspiration, and if we add 90 more for a forcible inspiration, the lungs will contain 410 cubic inches:—That *Cavallo* adopts 30 cubic inches as the amount of air inspired during natural respiration, when this is performed eleven or twelve times in a minute:—And that *Abilgaard* estimates a natural inspiration so low as 3 inches. Of these extraordinary discrepancies some must have been produced by errors of observation or faulty instruments of measurement. But it is probable that many of the differences have also depended on differences in the subjects of experiment. Independently of the obvious differences of stature and size of chest, a considerable difference in all probability exists according to the relative rate of the breathing in different individuals, which even in healthy subjects varies from eleven or twelve to twenty-four or even twenty-six in a minute.

This subject has been lately taken up by Dr Herbst of Göttingen, who in the journal quoted above gives a detail of the researches of all his predecessors, and of a numerous set of experiments which he has himself performed, apparently with great care. The instrument he prefers on account of its simplicity and the ease with which it may be managed is a variety of that employed by Dr Kentish, being simply a graduated glass bell-jar capable of holding 367 cubic inches (French measure,) standing in a vessel of water, and having at its summit a wide tube and stop-cock, to which was attached a glass tube of the shape of a horizontal S (∽.) When an unpractised person attempted to breathe in an easy manner out of this jar, the gravity of the water which rose into the jar to supply the place of the air withdrawn rendered his inspirations shorter than natural. This was soon made manifest by his requiring to take a long breath after several such inspirations. By practice, however, the various individuals whom Dr Herbst subjected to experiment easily acquired the power of breathing from the jar exactly as in the open air, so that after many inspirations no uneasiness was felt. Besides the accuracy of the results was always verified by subsequently causing them to make an equal number of expirations into the jar previously filled with water.

By observing all the requisite precautions, very uniform results were procured under similar circumstances. The quantity of air inhaled during easy breathing was found to be in unusually short people from 16 to 18 cubic inches, and in those of ordinary stature from 20 to 25 inches. *Menzies's* estimate of 40 inches was found to be such as no man could maintain for a short while without effort and uneasiness.

The extreme capacity of inspiration and expiration differed very much in different individuals. A healthy man, 22 years old, five feet ten inches tall, and of moderate strength, after a full expiration, inspired 184 inches, after a full inspiration expired 180. A delicate young man, 19 years old, could not inhale more than 90 inches after the fullest expiration. A stout lad of 16, and five feet two inches tall, expired after a full inspiration 160 inches. A little man, 22 years old, and of the same stature, expired 144 inches. A little Jew of the same age only 120. Fat men had commonly less capacity of lungs than others; two stout, healthy, fat men, one 27 and the other 30 years old, could not exceed 140. The greatest capacities which Dr Herbst had occasion to notice were 232 and 244 cubic inches; the former was the expiration of a powerful young man, six feet tall, the latter of a very powerful, broad-chested man of middle stature. The effect of tight clothes in diminishing the capacity of inspiration is very striking: A middle-sized man 20 years old, after a natural expiration inspired 80 inches when dressed, 106 when his tight dress was loosened; after a full expiration he inspired 126 inches dressed, 186 undressed. Another young man 21 years old, five feet eight inches tall, and of stout make, after a natural expiration inhaled while dressed 50, when undressed 96 inches, and after a full expiration 130 in the former case, 190 in the latter. In women the capacity of the lungs is much inferior to that of men. A girl 18 years old, and of middle strength, expired 106 inches after a full inspiration; another 19 years old 120 inches, and stout women about 30 expired from 130 to 144. It is probable that after a full, forcible expiration very little air remains in the lungs. From several experiments made on the bodies of healthy men who had died in consequence of severe injuries, Dr Herbst found that the lungs, when distended as far as possible without tearing them, never held more than 186 cubic inches.

A remarkable fact is that in proportion to their weight the lower animals have much more capacious lungs than man. The capacity of the lungs in grown up cats is from 20 to 24 cubic inches; that of a terrier twelve pounds in weight was 38 inches; that of a mastiff thirty-five pounds in weight 90 inches. Their relative capacity in different men appears *cæteris paribus* to bear a constant ratio to the bodily strength; and this enormous proportional increase in the lower animals is evidently closely connected with the same circumstance.

In diseases of the chest the capacity of the lungs is very much diminished. A pretty tall young man, affected for some time with palpitation, difficult breathing, cough, and soreness in the breast, could inspire after an ordinary expiration only 30, after a full expiration only 90 inches; a man 44 years old, and of middle stature, who had been long liable to *angina pectoris*, could inhale after a forcible expiration 96 inches; a man 36 years of age, who had all the symptoms of confirmed phthisis could inhale only 42 inches; a young woman, short in stature, and recovering partially from phthisical symptoms, could inhale 46 inches after a full expiration, 26 after an ordinary expiration.

On the Action of the Arteries in the Arterial Circulation, (Journal de Physiologie, Janvier 1829.*)*—In the original communications of the present number of this Journal is inserted a full analysis of a very valuable physiological paper by M. Poiseuille, a graduate of Paris, on the force of the aortic or left side of the heart. By a series of well devised and apparently accurate experiments the author arrived at the unexpected result, that the force of the blood in the arteries will support a column of mercury of the same height with whatever part of the course of the arterial circulation the column is placed in connexion,—whether for example it is connected with the origin of the carotid, or with a branch derived by repeated subdivision from the crural artery. And consequently he concludes that the force with which a molecule of blood moves is the same throughout the whole arterial circulation. Following out these researches he proceeds (in a paper, the subject of which is given as the title of the present article of intelligence,) to inquire in what manner the original impulse communicated by the heart is transmitted unimpaired to distant parts of the circulation, notwithstanding the retarding tendency of friction, and the yielding of the parietes of the vessels.

His first object here was to ascertain whether the arteries are dilated by the stroke of the heart and impulse communicated to the blood, and what the amount of the dilatation may be. It is well known that by most physiologists a very extravagant idea used to be entertained of the amount of their dilatation ; on the other hand, that the later researches of Parry, and other experimentalists have assigned exceedingly narrow limits to it ; nay, that by one eminent physiologist, Bichat, it has been denied altogether. M. Poiseuille has determined the point by means of a very satisfactory set of experiments with an apparatus of his own invention, and has ascertained that dilatation is effected, but that it is so small as certainly to be undistinguishable in an artery by the unaided senses. This apparatus cannot be thoroughly described without a diagram ; it will be sufficient, therefore, for us to mention, that it is so contrived, as to contain about eight inches of the carotid artery of the horse in a vessel filled with water, and made water-tight, except at one point from which a small horizontal glass tube issues, about an eighth of an inch in diameter. At each contraction of the animal's heart it was found that the water in this small tube advanced two inches and 8 tenths, and that it retired to its former place during the diastole of the heart. The diameter of the artery was 7-20ths of an inch. Hence it may be calculated that at each pulsation its capacity was increased by about a thirtieth part.

Having ascertained this fact, M. Poiseuille goes on to inquire, whether the power which is expended by the blood in causing this dilatation is restored by the subsequent contraction of the artery. For this purpose a portion of the common carotid artery of the horse 10 inches long and 7-20ths of an inch in diameter taken immediately after death was connected with the end A of such a tube as is represented in page 30 of this Journal, a stop-cock, however, being previously fitted between A and B. The other end of the artery was fixed on a tube of analogous construction, different in fact only in so far as the limb CD was inclined at about half a right angle instead of being vertical, and the stop-cock was placed near the end D. The whole of the first tube, the artery and part of the descending limb BC of the second tube was filled with water, a little mercury then filled the curvature of the second tube, and the ascending inclined limb of that tube above the mercury was filled with water. The stop-cock of the last tube being closed, and that on the first tube being opened, mercury was poured into the former by its end D till the pressure on the artery amounted to 95 millimetres or about 3.8 inches. The stop-cock of the first tube was then closed and that on the second tube was opened ; upon which the water rose instantaneously in the latter, a portion flowed out at the top, and the remainder then sank a little and assumed a fixed level, On making the necessary computations M. Poiseuille found that the point to which the mercury was raised in the second tube at the moment of the contraction of the artery indicated an elevation of 110 millimetres or 4.4 inches. Hence *the power with which the arterial coats contract upon themselves after being dilated exceeds that which is expended in dilating them.* In the present experiment the excess was equivalent to six-tenths of an inch of mercury, or 3-19ths more than the dilating force. In three other experiments the excess of the column of mercury was 9-20, 14-20, 19-20 of an inch. When repeated with the artery of an animal which had been killed four days before, the excess was less than 4-20. It is evident, therefore, that whatever force the blood after issuing from the heart loses in consequence of its acting on yielding vessels, is completely restored by the elastic contraction of their parietes.

Anatomical and Physiological Researches on Emphysema of the Lungs, (Journal de Physiologie, Janvier 1829.*)*—Pathologists in examining bodies after death have been accustomed to suppose that the lungs are in a healthy state, when they crepitate on being handled, and the air-cells are regular and not of unusual size. *M. Piedagnel*, in a paper contained in Magendie's Journal, undertakes to prove on the contrary, that the lungs are never healthy when they crepitate ; that they never crepitate except when affected with general or partial emphysema ; and consequently that emphysema of the lungs is an exceedingly common disorder, being in fact produced at the close of very many diseases by the dying efforts of the patient to maintain respiration. If, says he, the chest of a dog that has recently died without making violent respiratory efforts be opened, the lungs contract very much, and when taken out and handled or cut, they feel soft, flaccid, and totally destitute of crepitation. If again the same experiment be made on the chest of an infant that has only lived a few hours, and the lungs are gently and not too much inflated, they contract in like manner to a great extent, and do not crepitate when squeezed between the fingers. Or if the experiment be tried with the lungs of an adult who has died without a concluding stage of agony and not of a disease of the organs of respiration, it will likewise be found that the contracted lung is soft, more or less flaccid, destitute of crepitation when gently pressed or when cut into. Such then, he concludes, must be the natural condition of the lungs. But if the lungs of an animal, a child, or an adult, such as we have described, be inflated artificially with considerable force, they do not afterwards sink so completely, they are much more elastic, and they crepitate when handled or cut. Since crepitation does not exist in their natural state and may thus be produced at will, it must always be a morbid phenomenon when it takes place spontaneously. And on considering the circumstances under which it is produced, we must come, continues M. Piedagnel, to the conclusion, that it arises from the rupture of the air-cells and the passage of air into the cellular tissue between them. In the dead lung crepitation is caused by forcible distension from the trachea, and also very effectually by blowing air into a hole in the pleura; the obvious effect of which must be to distend the cellular tissue. Accordingly in the frog, in which the air-cells are large and the cellular tissue very scanty, the lungs cannot be made to crepitate by artificial distension. Towards the close of life it is caused by every form of disease which terminates in laborious breathing. Hence it is met with in all cases of violent and prolonged death, in every acute disease which terminates in long painful agony, and in all affections of the lungs or brain, which cause obstruction of the breathing. In such circumstances it will be remarked, that respiration consists in a sudden deep inspiration followed by closure of the glottis, and a gradual expiration, during which, in consequence of the difficulty the air experiences in passing through the glottis, it is subjected to pressure on the lungs. On the contrary, the lungs are seldom found to crepitate in chronic diseases which have had a long course and brought the patient by insensible steps to the tomb. In particular, they seldom crepitate after death from cancerous affections of the abdomen.

Since emphysema, then, is a derangement of structure so common and so easily produced in the last moments of existence, may it not also arise, adds the author, in other circumstances where its immediate cause is less evident? And may we not thus explain many of the alleged cases of sudden death, which happen not unfrequently in hospitals, without any morbid appearance being detected in the dead body to account for it? The two following examples are quoted in confirmation of this conjecture. A man, 36 years of age and of sound constitution, was admitted into the hospital of St Antoine, on account of pains in the abdomen and slight pulmonary catarrh consequent on suppression of a hemorrhoidal discharge. After being a few days in the hospital he was getting the better of his trifling ailments, when he began to complain of obstructed breathing, and a sense of weight in the epigastrium, which prevented him from taking a full breath. As his pulse was frequent, venesection was ordered; but before it could be performed, he died. On examining the body, the inspector could find no diseased appearance worthy of note, except that the lungs were voluminous, filled the whole chest, and crepitated strongly. Another man, 61 years of age, and in general healthy, but liable for three years before to occasional pulmonary catarrh, was admitted into the same hospital on account of violent cough with copious mucous expectoration, and mucous rale; but his breathing was natural. Three days after his admission he also complained of impeded respiration; and next morning he was found dead in bed. When the body was examined it was considered that every organ and among the rest the lungs were sound. The lungs, however, says M. Piedagnel, were crepitating and full of air, filled completely both sides of the chest, and on the left side were indented by the ribs, whence he had no difficulty in concluding that the patient had died from the sudden infiltration of air into the pulmonary cellular tissue.

Another practical inference which may be drawn from his researches is, that in supporting the breathing by artificial inflation of the lungs, care must be taken not to inflate the chest with too great force. This caution was suggested not long ago by M. Leroy d'Etiolle, in consequence of experiments on living animals of a nature parallel with those performed by M. Piedagnel after death. But it may nevertheless be useful to see what the latter inquirer has to say on the subject. He informs us that in 1826 he delivered a lady of a still-born child, which he endeavoured to bring to life by artificial inflation of the lungs, but without avail. On examining the body he could not discover any obvious cause of death, but the lungs were strongly emphysematous. He was therefore led to conceive that the emphysema had been caused by the inflation, and that thus a fresh cause of death had been unwarily added to that which already existed. On subsequently making some experiments on living animals he arrived at the same results as M. Leroy d'Etiolle. Sudden inflation caused immediate embarrassment of the respiration, proving speedily fatal; and he found in the dead body the lungs pale and emphysematous.

He further remarks, that pulmonary emphysema has appeared to him to be the cause of death in those extraordinary cases of sudden death, which have taken place during operations at the root of the neck, from the passage of air into the veins. In two melancholy instances which happened at Paris of sudden death from that cause, during the removal of a firm cellulo-fibrous tumour from the neighbourhood of the clavicle, one of which has been recorded in Magendie's Journal, vol. 1st, and the other in the 3d vol. of the *Archives Générales de Médecine*, M. Piedagnel says the most striking appearance was emphysema of the lungs marked by crepitation and the want of subsidence of the lungs. Death in such cases has been usually ascribed to the air entering the heart in such quantity as to deprive that organ of a due quantity of its proper stimulus; by others it has been ascribed to the air entering the brain in the arterial blood; but the author appears to us to give a more satisfactory explanation of the accident.

He is disposed to dissent from Laennec as to the possibility of mere dilatation of the air-cells of the lungs being accompanied with the symptoms of emphysema, and maintains that such a state of the lungs has been found in the bodies of persons who did not labour under any impediment of the breathing, and that in those who have had such symptoms there is always found, besides enlargement of air-cells, effusion of air into the cellular tissue around them, the effect, he supposes, of rupture of the air-cells at the time the breathing first becomes materially disturbed.

PATHOLOGY AND PRACTICE OF PHYSIC.

Observations on Hypertrophy of the Brain. (*Revue Médicale, Décembre* 1828.) M. Mc.Laennec, cousin of the late celebrated pathologist of the same name, has published under the above title an account of several cases which he considers examples of a peculiar disease of the brain, that is not unfrequently associated with other diseases of that organ, but may likewise exist, as in several of his cases, as a single independent affection. In the general summary at the close of his paper he states as the conclusions to be drawn from his inquiries,—that the brain, like every other organ, is susceptible of an obvious augmentation in volume and density, or in other words of a true *hypertrophia*:—That the anatomical characters of this hypertrophy consist in very great firmness of the cerebral substance, and a marked flattening of the convolutions of the brain, which flattening coincides with complete or almost complete emptiness of the ventricles, and sometimes with notable contraction of these cavities:—That this change of structure is constantly conjoined with epileptic or at least epileptiform symptoms:—That it developes itself with much greater rapidity than any other hypertrophia, a circumstance that makes it approximate to the inflammatory congestions, and appears to depend on the organization of the texture in which it is seated:—And that the causes of the lead-colic appear to have a very great influence in developing hypertrophy of the brain." The following is an abstract of five cases, the relation of which forms the chief part of the author's paper.

1. In the first case, that of a woman 32 years of age, symptoms of inflammation of the brain came on during an attack of sub-acute bronchitis; and during the subsidence of the cerebral symptoms, an attack resembling epilepsy was caused by a fright and proved fatal. The bronchitis, which on her admission into the hospital had subsisted eight or ten days, was attended with some fever, and dull headach. For five days she appeared to be doing well, when suddenly, without any precursory symptom, she became completely insensible, with dilated pupils, fixed eyes, knitting of the eyebrows, palsy of the left arm, slight contraction of the right arm, slow pulse, and retarded, irregular breathing. Twelve leeches were immediately applied to the temples, a blister on the nucha, sinapisms to the feet, and she was ordered a mixture of twelve grains of tartar emetic in orange-flower-water. The same evening the left arm became also slightly contracted. Next morning the contractions were strong; but the patient seemed to understand a little what was said to her. The orange-flower-water was continued, with fifteen grains of tartar emetic. On the third day of this attack she answered questions distinctly, yet only in monosyllables,

she saw well enough, the pupils were less dilated, and she complained when she was pinched ; but the muscular contractions continued. The tartar emetic was repeated in the quantity of eighteen grains. On the fourth day the cerebral symptoms had ceased, with the exception of slight dilatation of the pupils, and corrugation of the eyebrows. She went on well under the use of the tartar emetic, when on the seventh day she was frightened by an allusion on the part of one of the students to the probability of her death ; and next day she fell back into her former condition, with the exception of the contracted state of the arms. This new attack, however, only lasted six hours; and at the visit on the tenth day she appeared in a fair way of recovering. But at two in the afternoon immediately after drinking a cup of ptisane she cried out, threw her head back, grew pale, and fell into convulsions. Hurried breathing supervened, obscure pulse, complete insensibility, and in a few moments she died. On the examination of the body, the pia mater was found injected, and its tissue moderately infiltered ; the convolutions of the brain were on both sides remarkably flattened ; the substance of the brain was so firm that it rose up elastically after being strongly compressed, the lateral ventricles contained hardly a drachm and a-half each of serosity, and there was not a larger quantity in the base of the skull ; the tissues of the dura mater were gorged.

2. A white-lead manufacturer, 44 years old, was admitted into *La Charité* on account of colic, from which he had several times suffered before. He was subjected to the customary treatment of that hospital for lead-colic, namely frequent purging, occasional gentle opiates, and several purgative clysters ; under which treatment the colic almost entirely disappeared in the course of twenty-four days. At last he was all at once struck one afternoon with epilepsy, which lasted the whole of the subsequent night with trivial remissions only. Next morning he was still senseless, his countenance, which had usually a harsh ferocious cast, now expressed only pain and anguish, the lips were colourless and covered with froth, the eyes half shut and diverging, the pupils fixed and enlarged, the breathing stertorous, the pulse almost gone, the arms palsied and without stiffness. Leeches were ordered to be put on the temples ; but he died at one in the afternoon, before the physician's orders could be obeyed. On dissection the brain was found to fill completely the cavity of the skull ; the membranes were pale, the inner surface of the arachnoid glistening, yellowish, unctuous, as if lined with an albuminous crust ; the convolutions of the brain were so flattened as to be quite smooth ; the substance of the brain when cut did not pour out a single drop of blood, and was of remarkable firmness ; the cortical substance towards the back and lower part of the left hemisphere showed a space as large as a halfpenny of a rose colour and slightly softened ; the ventricles contained only the minute quantity of serosity which is seen there in the healthy state ; the cerebellum and *tuber annulare* were natural.

3. A white-lead manufacturer, 43 years old, became liable to costiveness from the time he took to that trade ; and in five months he was seized with pains in the limbs and feebleness, which quickly increased to absolute loss of power. After living six months in an hospital he got quite well again ; but on going back to his work the costiveness returned. At last one morning after breakfast he all at once lost his senses for three hours. Three days after, when he entered La Charité, his limbs were affected with tremors but were sensible ; his speech and ideas were confused, his head heavy and painful over the orbits, the tongue presented traces of bites, the pulse was full, the face flushed, the bowels indolent. The treatment for the lead-colic was immediately commenced, and for the first ten days with some apparent advantage. His ideas and speech became more free, and the tremors less violent ; but on the tenth day after his admission into the hospital he had a violent attack of epilepsy characterized by sudden loss of consciousness, stiffness and convulsions of the limbs, stertorous breathing, foaming at the mouth. These symptoms were succeeded by delirium, so violent that the strait-waistcoat was required. A blister was applied to the nape of the neck, and antispasmodics were combined with the purgative plan of treatment. On the thirteenth day the delirium began to abate, and his recovery was from that time so rapid that on the fifteenth he assisted the servants of the ward. On the morning of the twentieth, however, he had a fresh epileptic fit, which was followed by others in rapid succession during the rest of the day and ensuing night. In the intervals he lay in a state of deep coma, with palsy of the left and stiffness of the right arm. Next day the coma was not interrupted by convulsions, and he expired before evening. On dissection the membranes were found much injected, the convolutions so flattened as to appear al-

most effaced, the ventricles without a drop of serosity and their walls very dry, shrunk, and as if squeezed against each other, the tissue of the brain of its usual colour and firmness, the cerebellum without any diseased appearance, the pineal gland containing a few hard concretions.

4. A young woman, 22 years of age, had been only six months employed in a white-lead manufactory when she was seized with the lead colic, in the fifth day of which she was subjected to the treatment of La Charité with rapid success. Sixteen days after quitting the hospital in perfect health, she was attacked while at work with epileptic symptoms that lasted about half an hour, and were succeeded by recovery of consciousness. At midnight, however, she was found insensible, with the limbs stiff, cold, and affected with frequent twitches, the pulse small, the breathing very faint, the eyes sometimes fixed, sometimes rolling. During the first day after her return to the hospital she appeared to get a little better, yet without recovering her sensibility; but in the subsequent night she had several returns of the epileptic fits, a violent locked-jaw was added to these symptoms, and she died on the third day after her admission. On opening the body it was found that the cerebral convolutions were quite flattened; that the brain was firmer, denser, and heavier than usual, and too large for the skull-cap which had been taken off, so that it appeared inconceivable how the skull could have contained it; that the membranes were healthy, the ventricles of half their usual size and without serum, the cerebral substance of natural colour, firm, and moist.

5. A girl 13 years old, with a disposition to rickets and liable to headach and giddiness, was seized with bilious fever, for which tartar emetic was ordered. Before she took it, however, she suddenly fell down senseless, with the eyes staring and fixed, and the limbs somewhat stiff. Next day her state was the same, the pupils were enlarged and the pulse hurried. This state of matters continued till the fifth day, when the limbs became flaccid; and on the eighth she died.—On dissection the head was found flattened from above downwards and lengthened backwards, the cranium only a line in thickness, the vessels of the pia mater gorged, the convolutions very flat, the whole tissue of the brain unusually firm, so that when pressed between the fingers it could with difficulty be crushed, the lateral ventricles distended each with an ounce and a half of serosity, the cerebral nerves unusually firm.

The remainder of the paper consists of short allusions to cases, described by various authors, which appear to have been examples of the pathological condition of the brain here described; and the author quotes among these Morgagni, Jadelot, Scoutteten, and particularly the lectures of his late relation Laennec. The hardening of the cerebral tissue which seems to accompany all the cases of hypertrophia is usually thought to be the effect of a slow inflammatory process. But M. Laennec entertains doubts on this subject, and is disposed to consider the signs of inflammation which are sometimes seen along with it as accidental concomitants, and not as indicative of the cause of the hypertrophy.

Case of Spontaneous Combustion of both hands. (Archives Générales de Médecine. Mars 1829.*)*—We have occasionally transferred to our pages from foreign journals accounts of alleged cases of the spontaneous combustion of the human body. They are so unaccountable that a cautious man will perhaps always doubt them, and many so marvellous, that it would be absurd to give extension to the reports of them, except where the authority is apparently good. The instance we have now to notice will not yield to any former case in the wonderful and inexplicable nature of its particulars; but, in point of authenticity, it appears to be in many respects superior to any yet recorded.—A gentleman, of stout, healthy constitution, sober habits, and 24 years of age, one evening, immediately after extinguishing with his hands the burning clothes of his brother, who had accidentally set fire to them with sulphur, was attacked with such acute pain in both hands as compelled him to cry out for assistance. A woman, who was the first to come to his succour, observed that both hands were surrounded by blue flames. This was at first supposed to have been occasioned by sulphur, and an attempt was therefore made to extinguish the flames with cold water; but in vain. The gentleman then ran down stairs to a cutler's shop and plunged his hands in a quantity of mud, but derived very little relief. After suffering much torture in this manner for half an hour he ran to the house of the physician who relates the story; and on the way both he himself, and the woman who accompanied him, distinctly observed the blue flame around the hands. The physician, Dr Richond-des-Brus, met him at the door, and observed the hands red, swelled, and exhaling a sort of vapour or smoke. He instantly directed his patient to plunge his hands into a well that was opposite, and to keep them there till he felt relief. On his doing so the pain abated considerably, and the flame ceased. But when he had gone about a hundred and fifty paces homewards they re-appeared. On reaching his house he immersed his hands each into a bucket of water, which, as it got rapidly heated, he had frequently renewed. As often as he took them out of the water, he remarked a sort of unctuous matter flow along his fingers, and the blue light re-appeared, which, however, was not visible, except in a situation where the light of the candle was shaded, for example, under the table. A young gentleman who remained in the bed-room with him saw the blue light several times in the course of the night. Towards day-break sparks only were to be seen. During the succeeding day the pain was very severe; and large blisters, filled with reddish serum, had formed on the fingers; nay, in some places the cuticle was entirely removed, and the true skin grayish and corroded. The blisters being opened, cerate was applied to the denuded parts, and the whole covered with poultices. The inflammation which ensued was moderate, the suppuration healthy, and in six weeks the ulcers caused by the burning were entirely healed; but the cicatrices were very distinct, and several of the nails had dropped out.

"If," adds the relater, "the flame had not been perceived except immediately after the burning of his brother's clothes, one might have supposed that it had been occasioned by some fragments of burning sulphur adhering to the skin. But it resisted the effects of repeated cold affusion and of protracted immersion in cold water: it continued all night, and was spontaneously reproduced after having been extinguished in the water of the well; it was at first bright enough to astonish those who witnessed it, and to make the female who first saw it say that the hands burnt like candles. Such an explanation, therefore, is quite untenable. Although when my patient reached my house, I only saw a sort of smoke, yet it must be remarked that I had a candle in my hand at the moment and my servant another, so that the pale light emitted by the hands might have been present at that time and been simply eclipsed. If it was more visible after his return home, this might clearly have arisen from its being brighter as well as the apartment darker. To what then, should this combustion be ascribed? To hydrogen gas? But how could this gas have been generated? One might admit as probable that the brisk excitement occasioned by the first burning caused the disengagement of phosphuretted hydrogen gas, which would inflame on coming in contact with the air. Thus might be explained the trivial nature of the burns. But could we also account in such manner for the burning pain felt by the patient all the night after, for the continuance of the discharged gas and the reproduction of the extinguished flame? Electricity does not seem to me to explain the matter any better, The case is very analogous to one which is related in the *Nouveau Journal de Médecine* for Décembre 1822."

On Hydrophobia in the Sheep, and the possibility of its communication from that animal to others. (Journal de Physiologie, Octobre 1828.)—The professors of the Veterinary School at Alfort have lately made some experiments to illustrate the question, whether hydrophobia, communicated from the canine species to herbivorous animals, can be transmitted from them to others. The result is in the negative. In the course of their observations they had an opportunity of laying down with greater precision, than has hitherto been done, the symptoms of this disease as it appears in sheep. The first symptoms appear to have been analogous to those of the incurable worm disease, to which the sheep is so liable. But in no long time they assume a different character. The animal runs at and strikes with its horns the other sheep of the flock, and constantly attempts to mount them. This is accompanied with the same peculiar bleating sound which rams in the rutting season make while fighting with another. It is not really accompanied, however, with sexual appetite. Neither is it even attended with aversion to drink. The animal chews wool, bits of broom, stuff from the dunghill, and other objects, which it does not touch when in health; but does not swallow them. Dogs avoid them.

The disease appeared in the flocks of a proprietor near Alfort, in consequence of one of the shepherd's dogs becoming rabid, and attacking several sheep of a flock soon after sheep-shearing time, when of course he found it easy to penetrate their skin. The first case appeared in the flock thirty-four days after the dog was observed to bite them, and several others took ill between the thirty-fourth and thirty-ninth days. *MM. Girard* and *Vatel* inoculated with the saliva of two of them, on the third day of their illness, two sheep, a young dog, and a horse. The cuticle was slightly removed, the saliva applied to the wound in three places in each animal. None of these animals were affected by any symptom of ill health at the date of the publication of the narrative, namely, four months after the inoculation was practised.

On the Inefficacy of Ammonia and the Efficacy of the Cold Affusion in the Treatment of poisoning with Hydrocyanic Acid. (Archiv für Anatomie und Physiologie, No. 2, 1828.)—Some years ago Mr Murray of London proposed ammonia as an antidote for poisoning with prussic acid, and the trials he made with it on the lower animals were so satisfactory, that he advertised his willingness to take a dose sufficient to cause death in ordinary circumstances, provided a competent person should be at hand to administer his antidote. The investigations of which we are now to give an account will probably satisfy him that he might have found reason to repent his rashness, had any one been so curious as to accept his offer.

Dr Herbst after repeated experiments has come to the conclusion, that ammonia even in a concentrated state, when administered to an animal which has taken a dose of prussic acid large enough to prove fatal, and when not administered till the symptoms have existed for some space of time, will hardly ever save its life. But he admits that in cases in which the dose has not been adequate to occasion death, yet causes severe symptoms, this remedy is of substantial benefit by mitigating and shortening its effects. He further objects to its general use as an antidote, that in a tolerably concentrated state it instantly excoriates the parts to which it is applied, and that in a state so dilute as to be free from this inconvenience its efficacy ceases. The following experiments are given in support of the foregoing statements.—1. A middle sized mastiff received fourteen drops of Schrader's prussic acid, and when the symptoms were developed, yet had not passed the convulsive stage, twenty drops of *aqua ammoniæ* were dropped into its throat. It immediately sprung up and ran about, but soon fell again; and the muscles were less violently contracted. A drachm and a half of the ammonia was subsequently given at intervals, and always with the effect of making it jump up and run about for a little; but no permanent amelioration was produced. Fourteen drops more of the prussic acid were then administered, the effects of which were not in any degree lessened by the administration of another half drachm of ammonia. In a few seconds the animal expired. The tongue and throat were found excoriated and lined with blood.—2. Eight drops of the same acid were dropped into the throat of a Pomeranian dog four months old. Immediately he ran about confused and then fell down. While the respiration continued, a portion of a mixture of half a drachm of ammonia with half a cup of cold water was poured into its mouth. At first it was not swallowed; but the animal soon became somewhat brisker, tried to rise and then swallowed it; but its state of prostration rapidly returned, the muscles became flaccid, fresh doses of the mixture neither were swallowed, nor produced any amendment, and death ensued five minutes after the administration of the acid. The irritability of the muscles continued long after death, and the heart continued to pulsate for ten minutes.

In Dr Herbst's hands the cold affusion proved a much more effectual and certain remedy. "When the dose of the poison was insufficient to prove fatal, two affusions were commonly sufficient to dispel every unpleasant symptom. When the dose was larger, it was requisite to repeat it more frequently and to persevere for a longer time. The certainty of success depended greatly on the early employment of the remedy. It was most to be trusted when resorted to immediately after the administration of the poison, or at all events during the convulsive stage, while the muscles were in a state of contraction, the eyes staring, insensible and immoveable, the head drawn backwards, and the extremities extended. This stage is rapidly succeeded by general relaxation of the body, gradually increasing slowness and feebleness of the respiration, a slow, weak, or almost imperceptible pulse; and death is then close at hand. Even in this paralytic condition the cold affusion will sometimes recal the expiring spark of life; then the convulsions of the muscles were renewed, the extremities became again hard and immoveable; and by the gradual abatement of the spasms the effects of the poison were slowly dispelled." The following experiments are related in support of what is here mentioned.—3. A full grown spaniel of a small breed got six grains of Schrader's acid. Immediately he uttered a piteous howl, fell down, stretched out his legs, and in a few seconds appeared dead. Cold water was then poured over its head and back, and subsequently over the whole body; when the breathing began to return, the animal in a few minutes shook itself, and then tried to rise. In a quarter of an hour he was able to stagger forward a little. In an hour he had recovered entirely.—4. A strong pointer-bitch, five years old, took eight drops of Ittner's prussic acid. In a few minutes she staggered, drew her head backwards and was on the point of falling, when cold water was dashed over her head. Instantly she recovered, and in a few seconds she was as lively as before the experiment. Several fresh small doses of the acid were subsequently given, and always with the effect of developing its narcotic action; but they were as uniformly removed by a fresh affusion. In fifteen minutes violent vomiting of tough, white mucus supervened, and she slavered much. These symptoms, however, also ceased in an hour and a half, when she took her customary meal.—5. Next morning eight grains were again administered to the same animal. Immediately she tumbled down, and was attacked with opisthotonos of the most violent kind, the breathing became more and more obstructed and feeble, and speedy death was evidently threatened. No time was now lost in applying the cold affusion. In a single minute the breathing became regular, she raised her head, looked bewildered around her, but continued lying. After a second affusion she stood up, walked, but with difficulty, and in an hour was so well that no sign of the action of the poison could be observed.—6. The most decisive trial was the following. Two young poodles were chosen of the same age and size, and accustomed to the same sort of food. To one was given four drops of Ittner's acid, which had the effect only of causing temporary staggering. Eight drops were then given, and caused loud cries, mucous vomiting, and opisthotonos. From this dose too he was beginning to recover, when four drops more were given; and death then ensued four minutes after the first administration of the acid. The total quantity of acid amounted to seven grains. This quantity was next given to the other dog at one dose. He immediately turned round, staggered, and fell down incapable of stirring and insensible. The head was drawn strongly backwards, the legs were extended, and in scarcely half a minute afterwards the breathing was imperceptible and the pulse hardly to be felt. The cold affusion of the head was then resorted to without delay, as the muscles were flaccid, and the animal appeared dead. At first it had no effect. The earliest sign of returning animation was renewal of the opisthotonos, and extension of the flaccid extremities; at the same time he uttered a feeble cry, which soon afterwards became stronger. The stiffness of the body continued a long time. The affusion was then repeated over the whole body. The crying continued, and touching the body seemed to cause pain. The affusion being repeated every fifteen minutes, the respiration at length became somewhat stronger; but it always returned to its feeble state in the intervals. At eight in the evening (the author does not state the interval after the beginning of the experiment) the animal was completely restored to health, ran about, barked, and took his food as if he had never been ill.—7. Nine drops of Schrader's acid were injected into the external jugular vein of a little house-dog, 6 months old, in five minutes twelve drops more, and other five minutes fifteen drops, without any distinct effect except quickness, weakness, and irregularity of the action of the heart. Twelve grains (27 drops) were then injected at once, upon which there ensued involuntary discharge of fœces, most violent tetanus and all the customary symptoms, followed by flaccidity of the body and almost imperceptible breathing. The first cold affusions made the animal spring high up, and when continued they removed in no long time the paralysis of the hind legs, which was the last symptom that remained. In three quarters of an hour he had recovered completely.—8. Three days afterwards fifty drops were injected into the opposite jugular vein of the same animal. The tetanus was even more violent than before. The cold affusion was not resorted to, until the whole body was in a state of paralytic flaccidity, the muscles of the eyes alone preserving their spasmodic contraction. The effect of the remedy was equally remarkable as in any former experiment; after the first application the breathing immediately became stronger; and in four hours the dog was as lively as ever. The same beneficial results were invariably obtained in other experiments, in which the poison was applied to the eye, to the inner membrane of the nose, or to external wounds. When the dose was so large that its effects were beyond the reach of the cold affusion, it was observed to prove fatal instantaneously, that is almost before there was time to use the remedy.

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NOTICES TO CORRESPONDENTS.

Communications have been received from Drs Arrowsmith, Hancock, and Furlonge, and from Mr Robertson, and from Mr Nesse Hill. Dr Hancock's letter did not arrive in time to enable us to introduce his communication into the present number.

The following Works have also been received:—

An Essay on the Connexion between the Action of the Heart and Arteries, and the Functions of the Nervous System, and particularly its influence in exciting the involuntary Act of Respiration. By Joseph Swan. London. Longman, &c. 1829.

Nachricht von dem Gesundheits-Zustande der Hamburgischen Kranken-und-versorgungs-Haüser und der Stadt Hamburg. Von Nikolaus Heinrich Julius d. A. Dr. Drittes Heft 1826, 1827. Hamburg bei Perthes und Besser, 1829.

An Account of the Morbid Appearances exhibited on Dissection, Disorders of the Trachea, Lungs, and Heart, with Pathological Observations, to which a Comparison of the Symptoms with the morbid changes has given rise. By Thomas Mills, M. D. Honorary Fellow of the King and Queen's College of Physicians, Dublin. 1829. 8vo. pp. 203.

The Manual for Invalids. By a Physician. London, 1829. 12mo. pp. 368.

Hints for the Examination of Medical Witnesses. By John Gordon Smith, M. D. M. R. S. L., Professor of Medical Jurisprudence in the University of London. Longman, &c. London, 1829.

Augusti Caroli Bockii, M. et Ch. D. &c. Accurata Nervorum Spinalium Descriptio, Latine Vertit Albertus Fredericus Haenel, M. et Ch. D. &c. Lipsiae, 1828. 8vo. pp. 153.

Icones Septem Caroli Augusti Bockii, Descriptionem Nervorum Spinalium Illustrantes. Lipsiae, 1828, folio.

Pharmacopœia Homoeopathica Auctore D. Caspario. Denuo Edita Aucta atque Emendata a Dr F. Hartmanno. Lipsiae, 1829, 8vo, pp. 128.

Management and Diseases of Infants under the Influence of the Climate of India, being Instructions to Mothers and Parents, in situations when Medical Aid is not to be obtained; and a Guide to Medical men inexperienced in the Nursery and the Treatment of Tropical Infantile Disease, Illustrated by Coloured Plates. By Frederick Corbyn, Esq. Member of the R. C. of Surgeons London, &c. &c. Calcutta, 1828. 8vo. pp. 468.

Medicine no Mystery; being a brief Outline of the Principles of Medical Science. Designed as an Introduction to their General Study, as a branch of Liberal Education. By John Morrison, M. D. and A. B. Trin. Coll. Dublin. London, 1829. 8vo. pp. 165.

Engravings of the Nerves, copied from the works of Scarpa, Soemmering, and other distinguished Anatomists. By E. Mitchell, Engraver. With explanatory Letter Press; by Dr Knox, Lecturer on Anatomy. Edinburgh, 1829, 4to. These Engravings, of which seven are now published, are good copies of the originals from which they are taken.

An Essay upon the Treatment of the Deep and Excavated Ulcer, with cases. By Richard Antony Stafford, Member of the Royal College of Surgeons. London, 1829, 8vo. pp. 72.

A Treatise on Syphilis; in which the History, Symptoms, and Method of Treating every form of that Disease are fully considered. By John Bacot, Surgeon to the St George's and St James's Dispensary, and lately Surgeon to the Grenadier Regiment of Guards. London, 1829. 8vo. Pp. 280.

An Essay on the Deaf and Dumb; showing the Necessity of Medical Treatment in early infancy; with Observations on Congenital Diseases. By John Harrison Curtis, Esq. Surgeon Aurist to his Majesty, &c. &c. &c. &c. London, 1829. 8vo. Pp. 211.

Pathological and Practical Researches on Diseases of the Brain and the Spinal Cord. By John Abercrombie, M. D. Fellow of the Royal College of Physicians of Edinburgh, &c. and First Physician to his Majesty in Scotland. Second Edition, Enlarged. Edinburgh, 1829. 8vo. Pp. 476.

The Medico-Chirurgical Review and Journal of Practical Medicine. Edited by James Johnson, M. D. &c. No. 21, July 1829.

The London Medical Gazette, No. from January 3, 1829 to July 25, 1829.

The Midland Medical and Surgical Reporter, and Topographical and Statistical Journal, No. iv. Vol. i. May 1829. To be continued quarterly. This promises to be a useful periodical publication.

Mr Wishart is preparing for publication A Manual of the Diseases of the Eyes, arranged alphabetically.

THE

EDINBURGH

MEDICAL AND SURGICAL JOURNAL.

1. OCTOBER 1829.

PART I.

ORIGINAL COMMUNICATIONS.

ART. I.—*Quarterly Report of the Edinburgh Surgical Hospital from May to August* 1829. By JAMES SYME, Esq. Fellow of the Royal College of Surgeons, and Lecturer on Surgery.

IN the early part of this year several circumstances, with which it is not necessary to trouble the reader, induced me to resolve on the institution of a Surgical Hospital in Edinburgh. I was not unaware of the difficulty of the undertaking, but trusted that I should be able to accomplish it through the assistance of the medical students and of the public. I believed that the former, from the confidence which they were pleased to repose in me as a teacher of surgery, would support an hospital under my management from its commencement, and that the latter, from their benevolent feelings towards such establishments, would contribute to its maintenance so soon as they saw it fairly in operation and likely to succeed. Encouraged by these considerations, I calculated the expence of the undertaking, and ascertained, that, with accommodation and victuals for twenty patients, with suitable domestics, &c. it would not probably exceed L. 300 for outfit, and L. 700 for annual support. To defray these charges it appeared probable that the following funds might be realized :—

Contributions from the public, -	L. 100
Board of two house-surgeons, - -	200
Fees of students, - - -	250
	L. 550

There would still be left the expence of outfit and L. 150 annually. I made no doubt that the public would soon extend their support, so as to relieve me from this burden, but would willingly have agreed to submit to it permanently rather than not accomplish my object.

It fortunately happened that Minto House, a place familiar to most gentlemen educated in Edinburgh, at this time stood vacant. It was in every respect admirably calculated for the purpose in view, being situated close to the University, in a healthy part of the city, not actually upon, but immediately contiguous to, the densely inhabited ridge of the old town; having extensive private grounds, containing fifteen rooms, besides a ground floor provided with every convenience, and having an abundant supply of water with water-closets even in the highest floor. It may be added, that one very large and elegantly constructed room eighteen feet in height was well suited for an operating and lecture-room. I lost no time in taking a lease of these premises for ten years. Through the liberality of the proprietor every part of the building and inclosures was subjected to a thorough repair, and the grounds were reformed so as to be more useful and agreeable.

While these operations were in progress the vacancy for two house-surgeons was announced, a prospectus for the information of the public was circulated, and a petition was laid before the College of Surgeons, to request their recognition of attendance upon the Hospital about to be established as a qualification for obtaining their diploma. The College, after mature deliberation, determined that, as their diploma was a qualification for general practice, they ought not to be satisfied with attendance upon a purely surgical hospital, but that there could be no objection to receive a course of clinical lectures on surgery, provided I chose to deliver one of the same extent and duration with that of the Royal Infirmary. I thankfully accepted this offer, which promised to answer fully the purpose of my petition, by enabling me to derive a revenue from my pupils without increasing the expence of their education, and by recognizing the respectability of the institution.

The College of Surgeons, in the alterations which have just been made in their curriculum, require eighteen months of hospital attendance, of which twelve months must be in a general hospital containing at least eighty beds, and the other six, either in such an hospital, or in one purely medical or surgical. It is to be hoped that they will recognize for this purpose also the Surgical Hospital now established; but it is not proposed to make any application to that effect for at least a year, as the new regulation will only then begin to operate.

In order to satisfy the public that the institution was properly conducted, it seemed proper that the contributors should annually elect a body of directors, who might frequently visit the establishment, and report for the information of their constituents. In the meantime the following gentlemen kindly agreed to accept the office:—

Rt. Hon. the Lord Chief Commissioner.
Lord Moncreiff.
Sir Thomas Gibson Carmichael, Bart.
Sir Alexander Gibson Maitland, Bart.
James Gibson-Craig, Esq. of Riccarton.
John Wauchope, Esq. of Edmonston.
Professor Jameson.
John Christison, Esq. Advocate.
James Ivory, Esq. Advocate.
Alexander Smith, Esq. W. S.
Alexander Campbell, Esq.
Rev. John Brown.
John Hardie, Esq. Leith.
Alexander Clapperton, Esq.
Alexander Craig, Esq.

Treasurers.—Messrs Cunningham and Walker, W. S.

Dr Ballingall was good enough to accept the office of Consulting Surgeon.

Everything has turned out fully equal to expectation. In two days after the vacancies for house-surgeons were announced, ten applications were offered. The public have already contributed more than L.100 of annual subscriptions besides nearly as much of donations. And more clinical students applied than could be received, the college having restricted the number attending each course to forty, so long as the beds are not more numerous than at present, viz. twenty-four.

As it may now be reasonably expected that there will be derived from the public - - L.150 0 0 annually
From students, - - 350 0 0

L.500 0 0

it is proposed to make the duty of the house-surgeons be performed in future by my senior apprentices, which will save the time and anxiety requisite for initiating strangers into the ways of the house, especially as it would be unreasonable to expect a succession of such excellent persons to fill this office as the gentlemen who now do so—Dr Cunningham and Mr Smith.

The Hospital is visited every morning at ten o'clock. In the first place, the patients residing in the house are examined, then the students assemble in the lecture-room, where the patients who are desirous of admission, and also those treated as out-patients, are carefully examined before them. What seems interesting in the different cases is then pointed out, and questions are occasionally asked as to the diagnosis and treatment. I then perform what operations are required, and so conclude the business, which usually occupies about an hour.

The Hospital was opened for the reception of patients on the 8th of May. During the three months which have since then elapsed, 380 patients labouring under surgical disorders have applied to the institution for relief. Of these seventy have been admitted into the house.

There have been performed thirty operations, viz.

Amputation of thigh,	3	Excision of elbow joint,	2
———— arm,	1	———— cancerous sores	3
———— through tarsus,	1	———— warty excrescence	3
———— of great toe,	1	Fistula in ano,	1
———— thumb,	1	Hemorrhoids,	1
———— of finger,	2	Polypus nasi,	2
Excision of mamma,	2	Hypospadias,	1
———— tumour,	5		—
———— upper jaw,	1		30

There have been two deaths, under the following circumstances: An old woman, Isabella Macdonald, was brought to the Hospital on the 22d May, very severely injured by the wheel of a loaded cart passing over her. There was a comminuted fracture of the left tibia and fibula about their middle, where an extensive cicatrix indicated the situation of a wound which she had received in her youth from the bursting of a blunderbuss. The left elbow was fractured through the external condyle of the humerus, and on the fore-arm of the same side there was a large lacerated wound exposing the fascia. She was a weak emaciated woman, between 50 and 60 years of age, equally infirm in mind and body, and was regarded from all the circumstances that have been mentioned as little likely to recover. Nevertheless, she did extremely well for about a week, the wound healed, and the fractures seemed to be in a fair way of uniting; but on the seventh day it was observed that mortification had commenced at the injured part of the leg, and, as the system became affected at the same time, it was considered proper to afford the chance of amputation,—a slender one indeed, but still desirable in a case otherwise desperate.

Amputation above the knee by two lateral flaps was accordingly performed, and again the patient seemed about to rally. Her pulse, tongue, and appetite became natural, and the stump showed no tendency to mortification, but it did not heal by the first intention, and the irritation attending the more tedious process by granulation proved too great for the feeble remains of her exhausted strength. She became hectic, rapidly sunk under an uncontrollable colliquative diarrhœa, and died on the 13th of June. On dissection there was found extensive ulceration of the large intestines, apparently of old standing.

The second death was that of Nancy Ker, aged 2 years, who died in an hour or two after admission, and therefore ought not, according to the usual custom of hospital records, to be ranked among the patients treated in the establishment. This child was brought in on the morning of the 12th July, on account of a severe burn received the preceding evening by falling into a pot of hot water. The extremities at the time of admission were cold, there was no pulsation in the limbs, convulsions speedily ensued, and death took place early in the day.

Fractures.—Of these, there were two of the thigh, one of the tibia and fibula, one of the tibia, two of the radius, two of the olecranon, two of the humerus, one of the clavicle, one of rib, one of metacarpus,—in all 13.

The fracture of the clavicle was cured without any deformity whatever, in a fortnight, by means of the simple bandage, which is founded on the principle of keeping back the shoulders, and elevating the elbow of the injured side with a sling, without placing any foreign substance in the axilla.

Both the cases of fractured olecranon were worthy of notice, on account of the absence of what is generally considered a characteristic symptom of this injury, I mean a separation or drawing up of the broken process to some distance from the shaft, by the action of the triceps. Sir A. Cooper has well observed, that this does not always happen, being occasionally prevented by the strong fibrous covering of the bone at the injured part remaining entire.

This observation is important, since a surgeon not acquainted with it might readily overlook the true nature of the accident, of which mistake I have met with more than one instance, though the diagnosis is still very easy, owing to the mobility of the fragment in a transverse direction.*

Excision of the Elbow-joint.—This operation was performed twice, viz. on Janet Burns, aged 25, from Carnwath, and on John Wells, aged 9. The mode of procedure was the same as that detailed in the account lately published in this Journal of three cases where the operation was performed.

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* I once experienced much difficulty in treating a case of this kind, from a morbid accumulation of synovia consequent on the injury. Having found more gentle means unavailing, I evacuated the fluid by a small puncture, and then speedily obtained a cure.

There was nothing in the previous history of these cases worthy of mention. They both laboured under well-marked caries of the elbow-joint, and would both, a short time ago, have been condemned to amputation without any ceremony. Janet Burns was harassed by a slight degree of chronic bronchitis, which delayed her recovery, and rendered the complete and permanent establishment of her health somewhat doubtful. She left the Hospital considerably better in this respect than when she entered it, and with the prospect of retaining a useful arm.

The boy was a most favourable subject for the operation. His disease resulted from external injury, a fall on the elbow, his constitution was good, and he possessed a most excellent disposition, which induced him to perform accurately whatever he was desired in regard to the position and exercise of the limb. Five weeks have now elapsed since the operation, and he is beginning to regain command of the joint, which is nearly as moveable as ever. I expect a most complete recovery in this case, which will be the more remarkable, as a very large portion of the ulna was removed. After sawing off the extremity of the humerus, and cutting away with the pliers the olecranon and head of the radius, I thought from the sound appearance of the different surfaces that enough had been done, and dressed the wound. But it fortunately happened that when the excised portions were afterwards more carefully examined, one of the gentlemen present, Dr Vallange, observed, that the cut surface of the olecranon presented a small carious cavity, a portion of which must consequently have been allowed to remain. I immediately undid the dressings, and by replacing the olecranon discovered the carious part, which was a sort of cylindrical excavation no wider than a common quill, but running deeply into the bone. Having ascertained its extent by introducing a probe, I insulated the ulna as far as was necessary, and cut it across through the shaft, so as to detach the whole spongy portion of the bone, which was then removed, though not without some difficulty, owing to the connexion of the brachiæus internus.

In this case the only muscle left undisturbed was the biceps; and the difficulty of moving the joint ought to have been if possible still greater than some people allege it to be, when merely the triceps is detached from its insertion. It has surprised me considerably to find that my pupils felt it difficult to conceive how the efficiency of the muscles could be restored in these circumstances, since there are so many parallel cases of every day's occurrence, for instance the use of a stump, which is so soon regained, owing to the muscles fixing themselves round the bone.

The difficulty of conceiving this very easy matter was, however, so great, that I requested Mr Y———, whose case is detailed in my former paper on this subject, to allow the gentlemen attending my clinical lectures to satisfy themselves by ocular and manual examination of the very perfect command which he was able to exercise over his arm. This gentleman is preparing to finish his education as a clergyman, and finds himself able not only to write sermons, but to execute all the ordinary motions of the arm.

Amputation through the Tarsus.—Ann Stewart, æt. 10, entered the Hospital on the 4th June on account of caries of the foot, which had existed two years, in consequence of inflammation induced by the fall of a heavy stone on the instep. There was an opening over the middle cuneiform bone, through which a probe could be passed perpendicularly and transversely in a curved direction to the head of the metatarsal bone of the little toe, indicating throughout its course the existence of caries. There was considerable thickening of the foot at the part mentioned, but higher up it was quite natural. Amputation of the foot had been proposed, but this I was unwilling to perform, as it seemed that the operation of Chopart could be practised with every prospect of success. Having obtained full permission from the parents to do whatever was thought proper, I proceeded as follows:—Having ascertained the situation of the joint between the astragalus and os naviculare by feeling the projection of the latter bone, and that between the os calcis and cuboides by observing the middle distance between the line of the fibula and head of the metatarsal bone of the little toe, I made a semilunar cut from the one to the other, and then, instead of dividing the articulations, which I think renders the subsequent formation of a good flap very difficult, transfixed the sole of the foot from one extremity of the cross cut to the other, and then carried the knife close along the metatarsal bones, so as to detach an ample but well formed covering for the face of the stump. The disarticulation was next effected with the utmost ease, so as to finish the operation in a very short time, and the plantar arteries being secured, the flap was retained in its proper place by five or six sutures.

The wound healed by the first intention, and the patient was able to put her foot to the ground in less than a fortnight. It was then observed, too, that she had regained the power of counteracting the extensors of the ancle, owing to the flexors having obtained new attachments. This is an interesting fact, as many people have objected to the operation on the ground of its leaving no antagonizing power to the gastrocnemius and other extending muscles of the joint, whence the heel would be drawn up so as to point the cicatrix to the ground. Being in Göttingen some years ago, and seeing a patient on whom Langenbeck had recently performed the operation, I particularly inquired if, in his former cases, of which he had had two or three, any inconvenience on this account had been experienced, and was assured that there had not. The fact just mentioned will help to explain this. About six weeks after the operation, Ann Stewart came to the Hospital and walked into the presence of myself and pupils, when we were examining the out patients, so that I really could not from her gait fix upon the defective foot.

Excision of the upper jaw.—As this case was fully detailed in the last number of this Journal, I have only to state with regard to it, that the unfavourable prognosis then given has not been verified, in as much as though nearly three months have elapsed since the operation was performed, there is no appearance of a recurrence of the disease. I am at a loss to account for this, unless the separation of a very large slough about a week after the operation be considered a sufficient explanation. At all events, the man continues quite well, with the exception of a small gap in his cheek, and feels particularly comfortable in being freed from the distracting and incessant pain which formerly tormented him.

Exfoliation of the whole upper jaw.—The extraordinary case of an out-patient may here be mentioned. Mrs C——, about nine years ago, when 20 years of age, became afflicted with a sore on the nose, for which, by the advice of a surgeon in town, she took very large quantities of mercury. The sore extended, the bones became affected, and a rapid exfoliation commenced, which soon deprived her of all the face, except the lower jaw and part of the ossa malarum. I first saw this wretched woman about four years ago, when she presented an appearance inconceivably shocking. The eyes were divested of their coverings, the pharynx was completely exposed to view, and the tongue lay exposed from root to apex, surrounded by the foul and vacillating teeth of the lower jaw, while the whole surface exhibited a most unhealthy description of ulceration. I saw her about six weeks ago, having not done so for a long time previous, and was surprised at the change which had taken place. A cure, so far as a cure was possible, had been completed; the whole ulcerated surface was healed, and the eyes were covered with a firm skin. She was miserably weak, and for a long period had subsisted on little else than laudanum, of which she took daily at least half an ounce. She died soon after this time, when I fortunately obtained the whole head, and ascertained that the remaining bone was everywhere perfectly sound. I do not know how this cure can be explained, except on the principle of the *Hunger Cure;* and think it may perhaps lead to a trial of this severe but powerful remedy in other desperate cases.

Actual cautery.—For some time past I have made much use of another remedy very fashionable in Germany, I mean the actual cautery, as a counter-irritant. In the *morbus coxarius,* and similar disease of the shoulder joint, the *Omalgia* of Rust, I have derived the most striking benefit from its employment. The only case affording fair opportunity for its application was that of William Aitkinson, æt. 36, a plasterer, who was admitted on 9th June labouring under extreme weakness and loss of command of the inferior extremities, with pain and weakness of the back, which was tender to pressure in the region of the loins. His complaints had existed for six months, and were increasing. I burned him very freely with the prismatic cautery of Rust on both sides of the spinous processes of the lumbar vertebræ, and had the satisfaction of seeing him improve daily, so soon as the slough separated. His improvement was regular and progressive, so that when dismissed on the 22d July, he laboured under awkwardness more than weakness of the limbs; he was able to walk quickly, and even to leap with both feet,—in short, had the prospect of a perfect recovery.

Amputation of thigh.—One of the most interesting cases was that of John Parkinson, æt. 10 years, who entered the house on the 17th June on account of what seemed at first sight phlegmonous erysipelas of the left leg. The whole limb from the ancle to the middle of the thigh was much swelled, red, and excessively painful. Having learned that these complaints had existed for nearly a week, notwithstanding the repeated application of leeches, and observing that the pain, which was chiefly referred to the inner or tibial side of the knee, appeared to be more agonizing than that usually occasioned by inflammation of the skin and subcutaneous tissue, I suspected that the mischief was deeply seated. On the following day, perceiving an obscure sense of fluctuation, I made several free incisions into the limb, and evacuated a great quantity of bloody pus. The limb became much less tense and painful, and I hoped that my diagnosis had been incorrect, but this prospect of amendment was soon blighted. The pain, though diminished, still continued, the discharge was profuse and unhealthy, symptoms of hectic made their appearance; and when the different openings over the tibia were examined by a probe, the bone was found to be completely insulated from the soft parts. The bone having thus died without providing a substitute, it seemed to me impossible to save the limb ; but as many people would have thought me rash had I acted immediately on this conviction, I resolved to wait until the affair was more clearly decided. He became weaker and weaker ; he passed frequent stools tinged with blood ; and on the 30th he was so very low, that I blamed myself for having waited so long, and feared that amputation would hardly save him. Another unpleasant symptom also now appeared, viz. a swelling of the lower third of the thigh, evidently connected with the bone, and extreme tenderness on pressure, which led us to apprehend that the femur was about to die like the tibia. Discouraging as these circumstances were, we resolved on the operation, as affording the only chance, especially as it would be the most likely means of checking inflammation of the femur, if it existed, and of facilitating the removal of any exfoliation that might ensue from it.

The operation was performed as usual by two lateral flaps. On examining the limb, we found, that, with the exception of a small part near the ancle, the tibia was dead throughout its whole extent ; even the epiphysis of the knee had perished, and lay bathed in the contents of a great abscess, which distended the joint, and reached up the thigh so far, that the incisions of the operation had almost opened it, though they were made purposely very high, to avoid the suspected part of the bone.

The diarrhœa and other unpleasant symptoms disappeared soon after the operation, under careful medical and dietetical treatment. By the end of a fortnight the wound was healed, and the patient seemed safe, but he then began to droop, his diarrhœa and other hectic symptoms returned, and matter issued profusely from two small apertures in the cicatrix of the stump, which became somewhat swollen and tender to the touch. He continued in pretty much the same state for another fortnight, when we judged it expedient to send him home (Leith Walk) to try the effect of a change of air, and gratify his own ardent longing. About a week after his return, which was on the 22d July, he began to improve, his hectic symptoms left him, and the stump contracted to its proper size. A probe being then introduced through one of the openings above-mentioned, encountered an exfoliation partially detached but not loosened from the femur. When it separates, an opening must of course be made for its extraction ; but unless some adverse change takes place, there can now be little fear as to his ultimate recovery.

This case is interesting in several respects. Though the phalanges of the fingers too frequently perish through their whole extent, in consequence of the acute inflammation, which occurring in this situation is designated paronychia, it is rare to meet with a similarly speedy and complete destruction of the large bones. It is true that some people who still believe in the possibility of dead bone being absorbed by the living vessels, or dissolved by the pus, may entertain a different opinion. This is not a proper occasion for entering on discussions respecting necrosis, otherwise it might easily be proved that the whole shaft of a bone very rarely dies entire, and that, when it does so, there is either no reproduction, or the substitute has been formed more or less completely previous to the demise of its parent.

In this case the destruction was not confined to the shaft, but extended into the knee-joint, contrary to the tenet of some writers, that the epiphyses are exempt from necrosis. There are several preparations in my museum which show the same thing, particularly one of a tibia, which was lately given me by my friend and former pupil, Dr Arrot. It was amputated by his brother in Arbroath, on account of extensive abscesses of the knee-joint.

The exfoliation also which is now going on, notwithstanding the speedy and apparently perfect union of the flaps, is interesting as an indication of the tendency to die, which is occasionally observed in the whole osseous system. Every practical surgeon must have noticed cases where the shafts of almost all the bones of the body were affected with necrosis, just as their heads are at other times occupied by scrofulous caries.

Amputation of the thigh.—William Macintyre, aged 54, entered the Hospital on 29th July, on account of a diseased state of the inferior extremity, which made him desirous to part with it. The foot presented an extraordinary appearance, being greatly enlarged, and strangely altered in form, so as to constitute a shapeless unwieldy mass, equally useless and unseemly. He stated, that for the last five or six years he had suffered from repeated and almost uninterrupted attacks of inflammation and suppuration of the limb, in the course of which most of the toes dropped off. There was still a large sore in the fore part of the foot, but most part of its surface, together with that of the leg, was covered with thick cicatrices. The patient suffered little, except from unwieldiness of the limb, owing to the weight of the foot, and stiffness of the ancle-joint, which, by preventing him from placing the heel on the ground, rendered progressive motion quite impossible, except by means of crutches, but he was rendered so unhappy by this state of helplessness, as to desire the only relief which it was in our power to afford—removal of the limb. The thickened and indurated condition of the soft parts rendered it impossible to obtain a covering for the bones any lower than the highest practicable point for amputating below the knee, viz. at the tuberosity of the tibia, and here only by forming two equal flaps according to the plan described in a former number of this Journal. This operation having been performed, we were sorry to find that the bones presented such an unhealthy appearance, as precluded any reasonable prospect of a cure, and therefore, however unwillingly, determined on repeating the amputation above the knee. This was immediately done, the popliteal artery, which alone required a ligature, was secured, and the edges of the wound being stitched together and suitably dressed, the patient was conveyed to bed wonderfully little exhausted by his sufferings. He did extremely well afterwards, with the exception of some nausea and vomiting on the third day, and has now every prospect of a speedy and perfect recovery.

Amputation of fore-arm.—John Baxter, a white faced unhealthy looking boy, had for six or eight months laboured under a scrofulous enlargement of the wrist, with caries of radius. I did not think this in any respect a proper case for excision of the diseased bone, and therefore amputated the hand by two flaps. Dissection proved the necessity of the operation, by showing the whole synovial apparatus of the carpus greatly thickened, and completely degenerated into the true gelatinous condition which indicates the scrofulous action. The radius was even more widely diseased than had been supposed.

Amputation of fingers and toes.—It was necessary to remove several fingers and toes on account of the destructive effects of paronychia and caries of the articulations. The amputations were all performed at the metacarpal and metatarsal joints by two lateral flaps, which were not made, however, quite according to the plan of Lisfranc, who forms one while cutting into the joint, and the other when cutting out from it. This method answers very well where the parts concerned are in their natural state as to softness and laxity, but can hardly be accomplished without injury to one or other of the flaps where they are thickened and indurated, in consequence of the preceding inflammation. In such cases, I think it is much better to form the two flaps previous to opening the joint, and even make a little dissection if it is required, to separate their preternaturally firm connexion to the subjacent parts.

Though the bad consequences of leaving an articular surface in amputation are certainly by no means so great as they were formerly supposed to be, it cannot be denied that the wound, after apparently being nearly or entirely healed, is subject to repeated attacks of pain and redness, with more or less discharge of thin serous matter. This disturbance, which is doubtless to be ascribed to irritation attending the removal of the cartilage by absorption, occurs more frequently and to greater extent when the disease requiring amputation is acute, than when it is chronic, of which there was a good illustration when the cases in question were contrasted with that of amputation through the tarsus, since in three of the former there was considerable trouble from the source referred to, while in the latter the much more extensive articular surface offered no obstacle to the cure.

It would, I am convinced, be a prudent precaution in removing fingers, where the integuments concerned in the operation are altered by the disease, to take away the articulating extremity of the remaining bone. This can be readily done with cutting pliers, and will prevent any risk of the bad consequences above-mentioned. Thus, in operating on Robert Loughead, a stout overfed porter, whose great toe was carious, in consequence of a bruise received some weeks previous to admission by the fall of a heavy box, and where the integuments were much thickened, &c. I cut off the round articular head of the metatarsal bone.

Excision of mamma.—Mary Messer, æt. 38, from Torwoodlee, had been afflicted for nearly three years with all the symptoms so well described by Sir A. Cooper under the title of irritable tubercle of the breast. About two years ago she consulted me on account of these complaints, when I recommended the use of means proper for restoring the uterine secretions, which had long been very irregular, and for three months previous to that time altogether suppressed. She complied with these directions, and in the course of a week had a return of the interrupted discharges. Her complaints were then much alleviated, and continued to be so for several months, when, though the uterine actions continued regular, the symptoms of her complaint became considerably aggravated, and at length the almost incessant, occasionally most unsufferable, pain of her breast shooting into the arm, shoulder, and side, tormented her so grievously both night and day, that she resolved on having the disease removed by the knife. With this view she was sent to the Surgical Hospital by my friend Dr Anderson of Selkirk.

Conceiving it right to comply with the patient's urgent desire to have the breast excised, since all other means of relief had failed, and success had attended extirpation of the testicle when similarly affected, I performed the operation on the 13th May. The wound healed by the first intention, and she left the Hospital on the 23d, quite free from her former sufferings, and in a state of mind very different from the extreme dejection and anxiety which characterised it previous to the operation. According to the latest accounts from Dr Anderson she continues perfectly well. The breast on dissection exhibited the appearances described by Sir A. Cooper, being merely more dense and uniform in structure than usual.

Excision of Mamma.—Janet Anderson, æt. 40, entered the Hospital on the 8th of May, on account of a scirrhus mamma, which had recently suppurated to a small extent on the surface; it was removed a few days afterwards, the wound healed by the first intention, and she would have been dismissed as quickly as the last mentioned patient, but an abscess formed in the axilla, which excited our worst suspicions, and induced us to detain her for some time longer. Fortunately this abscess did not turn out to be malignant, but healed most satisfactorily, and the patient was dismissed quite well on the 18th June. She returned a few days ago to show that she continued free from complaint, and offer thanks for the care which had been bestowed upon her, previously to departure for the north. *

Margaret Mathieson, aged 23, was recommended to the Hospital on the 10th of June by Dr Johnston of Kirkaldy, on account of a very large and exceedingly hard tumour in the axilla. It filled the axillary cavity so completely as to prevent the arm from being approximated to the side, and was occasionally the seat of severe lancinating pain. It had existed more than half a year, and was continuing to increase progressively. Notwithstanding the youth of the patient, the symptoms just mentioned would probably have induced me to remove the tumour, had other circumstances been favourable to this proceeding, but it was rendered quite impracticable by the firm connexions of the tumour, and even if this objection could have been overcome, the existence of many hard tumours of a smaller size in the neck and throat would have rendered an operation quite unjustifiable.

It occurred to me, that, as the uterine discharges were suspended, advantage might result from the internal administration of cantharides, especially as this medicine has a very remarkable effect in promoting the action of the absorbent vessels in general. In no long time after commencing the course prescribed to her, she noticed a remarkable diminution not only of the pain, but also of the swelling, and regularly improved until the 10th of July, when, being comparatively speaking well, she returned home in great joy at her recovery.

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* It has afforded me equal pleasure and surprise to find that the patients of the Surgical Hospital have manifested by their conduct and expression much more gratitude for the attention bestowed on them, than is usually met with in treating people of the lower orders, especially in hospitals.

Warty Excrescences.—Of these the most remarkable was that of J. M., aged 32, who was admitted on the 8th of June to be relieved of a most painful and unseemly growth from the glans and prepuce. Some months previously he had had the prepuce slit open on account of warts which continued to increase after they were exposed to view, so as at length to occasion the frightful mass for which he sought relief. A very small part of the anterior part of the glans was visible; behind this there was a hard irregularly tuberculated tumour about the size of a small orange, from which proceeded a most fœtid discharge, and frequent severe burning lancinating pains shooting into the groins. It is not improbable, that when pathological distinctions were less attended to than they are at present, this tumour would have been at once regarded as cancerous, and considered a sufficient warrant for amputation of the penis.

Concluding, from all the circumstances of the case, that the disease was not malignant, I cut away the excrescence by means of a straight sharp-pointed bistoury introduced between it and the glans, so that the morbid part was detached in the form of a ring. Some small portions which remained were afterwards easily taken away by scissors. The wound was dressed with dry caddis; it healed most kindly, and permitted the patient to depart in a fortnight.

Hæmorrhoids.—Of this disease a very severe case occurred in a young man, John Begrie, æt. 22, from Greenock, who had for many months been harassed by frequent and painful stools, with purulent and bloody discharge. He had suffered several operations, as he said for fistula, and believed that his complaints depended on stricture of the rectum. On examination I could not find any contraction of the gut within reach of my finger; and before subjecting him to the exploration of bougies, I determined to remove several large vascular and painful hæmorrhoids which existed round the verge of the anus. There were several more excrescences of the same sort within the sphincter, but it did not seem to me prudent to interfere with them, at all events in the first instance, since the removal of external piles so frequently cures those which are internal. I accordingly excised the first mentioned tumours by means of double hooked forceps and scissors, and had the satisfaction of finding my prognosis amply verified, as the patient left the establishment in a few days restored to health.

Fistula in ano.—There was only one operation performed for this complaint, and it was interesting merely as an instance of the extreme facility with which this formerly so much dreaded disease may be cured by the improved practice of modern surgery. It appears that the circumstances of most importance to be recollected are, 1*st*, That the internal opening must be included in the incision of the sphincter; 2*d*, That when the internal opening exists, which it almost invariably does, it is situated very close to or rather at the sphincter; 3*d*, That it is not necessary to divide the gut higher than the internal opening; and *lastly*, that no dressing ought to be interposed between the cut edges, at all events not after the second day. It is truly astonishing that so many practitioners should still remain unacquainted with these important facts which lead to a practice as simple and successful, as the one, or rather the many, which preceded it, were operose, distressing, and inefficient.

It is particularly to be regretted, that the observation of M. Ribes, in respect to the situation of the internal opening, should have met with so little attention in this country.

John Finlay, æt. 45, had suffered for many months from fistula in ano. The operation was performed on the 17th June, and he left the Hospital eight days afterwards in such a state of convalescence, as enabled him to resume his employment of night patrol in the police establishment; and, to use his own words in a letter of thanks addressed to me the other day, "has been on duty ever since both wet and dry, has not experienced the least symptom of his complaint, and is now as sound and stout as he ever was in his life."

At the same time with this patient, I operated upon a gentleman who had long been harassed in the discharge of his military duties, by a similar complaint. On the second day after the operation, he dined abroad at some distance in the country, and in a few days more departed for London, where what remained of the wound healed without any trouble, so that he returned in perfect health. Fistula in ano is too frequently connected with morbid conditions of the lungs and intestines, equally fatal and incurable; but where it exists without such complication, ought to be regarded as one of the most simple and satisfactory subjects of surgical practice.

Hypospadias.—The case of John Sparks, æt. 2½, labouring under congenital hypospadias, was remarkable, in so far as, besides the preternatural aperture at the neck of the glans constituting the disease, there was an appearance of the proper opening, separated from the former by a bridge of skin. On introducing a probe into the superior or proper opening, I found that it did not lead to the urethra, but terminated in a narrow *cul de sac*, about half an inch deep. The preternatural opening was extremely small, indeed hardly visible, and it was on account of the difficulty of voiding his urine through it that the patient's friends brought him to me in quest of relief. It would have been easy to afford temporary relief by dilating the unnatural opening; but it seemed to me better to perform the operation so as to attain this object, and also prevent the future inconvenience of being unable to effect impregnation owing to the dependent position of the orifice of the urethra. I therefore divided the septum between the two canals, and propose, so soon as the wound is healed, to close up what is necessary at the lower part of the opening, so as to give it the proper direction.

Cancer of the Lip.—The general or rather invariable plan of removing cancerous sores of the lip followed in this country is to include them in two oblique incisions, which unite at an angle, more or less acute, towards the chin. When the disease affects the lip to much depth, this proceeding is probably the most advantageous that can be adopted, but when it is superficial, and especially when the surface is extensively affected, it is equally injurious and unnecessary. In such cases the surface alone requires to be removed, and if this be done properly, instead of the hideous deformity which results from removal of the lip, there is hardly any alteration to be perceived. It is in such cases that the plan recommended by Richerand in the Annuaire Medico-Chirurgicale is decidedly preferable to the common one, which ought to be restricted to those occasions where the lip is deeply affected. I find on a comparative trial with other means that the curved scissors are by far the most convenient for effecting the removal in question ; but instead of healing the wound by granulation, according to the advice of Richerand, it is much better to unite the skin and mucous lining of the lip by means of sutures, either twisted, or what answers better, interrupted.

George Angus, æt. 50, from Limekilns, applied to the hospital on account of a sore on the lower lip, which had existed for two years, and resisted all the ordinary measures for its cure. There were two horny excrescences proceeding from it, and the patient complained of occasional pain. As there was no induration of the lip under the base of the sore, I removed it with the curved scissors at one cut, and sewed the edges together. The patient suffered no inconvenience, and returned home in three days without the slightest deformity.

Tumour of orbit.—Edward Ramage, aged 3, from Selkirk, was sent to town by my friend, Dr Anderson, on account of a tumour of the orbit which had existed or rather been noticed for six months. There can be little doubt that it was of older standing, since the first thing that attracted attention was the one eye being smaller than the other, in other words, the distension of the lower eyelid so much that it prevented the eye from being seen. The patient latterly complained of pain in the swelling, but continued to enjoy the most robust health. I made an incision on the tumour in the direction of the fibres of the orbicularis palpebrarum, and exposed its surface so far as was possible by dissection. Having ascertained, what we had previously every reason to expect, that it went back into the orbit, I attempted to disengage it from the surrounding parts, but finding that it rested closely on the orbitary plate of the maxillary bone, I removed the bulk of the mass, and then, by careful manipulation with my fore-finger, dislodged what remained. The pieces when put together seemed to be perfect, and nothing more of it could be felt in the orbit. The tumour possessed a very dark colour, and so far might be called melanotic, but, instead of having the friable, granular or almost semifluid consistence of the morbid formation usually designated by this title, it had a fibrous structure more like that of the worst species of osteo-sarcoma. Our prognosis, therefore, as it might be supposed, was not very favourable. The patient, however, did well, and in the course of a fortnight returned to the country, where, the last time I heard of him, he was running about as usual.

Hydrocele.—There were only two cases of hydrocele, but both rather interesting. The first was that of William Macintosh, æt. 28, a north country cattle drover, who entered the Hospital on the 17th May, labouring under the following complication of diseases :—Sores on the penis, bubo, ague caught on passing through some of the fenny districts in England, and a hydrocele of nine years standing. Having subdued his other disorders, I punctured the hydrocele, and evacuated a large quantity of chocolate-coloured fluid, holding in suspension many of those small shining scales which my friend Dr Christison has found to be Cholesterine. As there was much enlargement of the testicle, and great thickening of the sac, we did not think it right to inject, and proposed to the patient to perform either the old operation of excising the sac, that is to say, a portion of it, or the more simple process of castration. He preferred the latter, but before submitting to it, found it necessary to return to the north to execute some business of importance. It is this sort of hydrocele which has been named hæmatocele, and probably with some reason. In the case just related it was observed, that when the dark brown fluid was allowed to stand quietly in the glass, a quantity of pure blood collected in the bottom, and in another case formerly under my care, the hemorrhagic nature of the disease was still more manifest. I punctured a large hydrocele, and drew off a quantity of the same sort of fluid as above described; but finding that by far the greater part of the swelling still remained, and that the patient, who for several years has been frequently prevented by fits of pain from following his avocation for weeks together, was now suffering more than ever, I proposed removal of the testicle, and performed the operation with perfect success. On examining the tumour, I was not a little surprised to find the testicle quite sound, and that what had led me to think it enlarged was a great mass of dense fibrinous matter, which adhered no less firmly to the tunica vaginalis than the coagulum of an old aneurism does to its inner surface.

The other case of hydrocele treated in the Hospital was that of Alexander Wood, aged 24,—a well marked case of hydrocele of the cord. I drew off the contents, which were perfectly pale and limpid, but did not inject, since it seems that dropsy in this situation is not so apt to return after evacuation as when it is seated in the tunica vaginalis.

The patient accordingly had a very slight return of the swelling, which soon subsided, and he has been dismissed cured.

Compound fracture of the wrist.—Kenneth Mackenzie, aged 38, a sailor on board a merchant vessel, while at Marseilles, about five months previous to his admission, fell from the top of the main-mast, and, besides sustaining other injuries, fractured the left wrist. He was long in the hospital at Marseilles, and since his discharge had assisted in the escape of several small pieces of bone. Judging from the smooth surfaces and angular edges of these pieces which he had preserved, that they had been detached by violence and not by ulcerative absorption, I concluded that the sinuses, pain, and swelling of the extremity which still continued, were owing to some other loose fragments still remaining, and, having detected one with the probe, lost no time in removing it. He immediately began to improve, and though the joint remained stiff, the laxity of the integuments, the freedom from pain, and the drying up of the discharge, proclaimed a most beneficial alteration.

It was my intention to have detailed some other remarkable cases, particularly one of a wonderfully extensible state of the skin, similar to the well-known one of the Spaniard recorded by Job a Meekren, or that of Eleanor Fitzgerald by Mr John Bell, and also to have made some general observations on other surgical subjects, particularly the treatment of burns, glandular swellings, and ulcers, of which there were a great many of all descriptions, especially among the out-patients. The results of blistering old indolent sores in imitation of the natural cure, which is occasionally observed to happen after an erysipelatous affection of the ulcerated limb, appeared among these deserving of notice. But this report has already attained such a length that it would be improper to prolong it any further.

Many people thought it rash in me to undertake a clinical course before having a single patient in the Hospital; but I trust that what has been said here will be sufficient evidence that materials for the purpose were not wanting. And there can be no doubt, that now when the Hospital is fully established, and every day becoming better known to the suffering poor, it will be in my power to increase the interest not only of my Clinical Lectures, but also of the Reports, which it is my intention to publish regularly through the medium of this Journal.

It would have been tiresome to mention all the occasions on which I derived advantage from the sound judgment of my excellent colleague; but I cannot conclude the present report without expressing my grateful sense of the acknowledgments due from all connected with the establishment to Dr Ballingall, for the manner in which he discharged his duties as consulting surgeon.

75, *George Street, 8th August* 1829.

Art. II.—*Case of a Tumour of the Radial or Spiral Nerve of the right Arm removed* by Harry Leeke Gibbs, M. D. Member of the Royal College of Surgeons of London.

Philip Chilaieff, æt. 42, a sailor of robust make and plethoric habit, was admitted into the General Naval Hospital of St Petersburg on the 24th December 1828. He stated that about fifteen years ago he received a blow with a handspike on the outside of the right arm;—that the pain at the time was severe and followed by numbness down the fore-arm to the back of the hand and fingers, and that these morbid sensations did not completely subside till some months had elapsed. Half a-year from the infliction of the injury he first perceived a moveable subcutaneous swelling, of the size of a kidney bean, about four inches above the elbow-joint, just below the insertion of the deltoid muscle, painful to the touch, and accompanied by lancinating pain in the course of the branches of the radial nerve on being pressed. These symptoms were increased by violent exercise or changes of the weather. For twelve years and a-half the tumour remained stationary and without pain, when two years back (from long-continued hard labour as he supposes) it gradually increased, and at the same time the lancinating pains down the fore-arm recurred.

At his admission into the Naval Hospital, I discovered a prominent tumour of the size of a small hen's egg, tolerably moveable, but connected by a cord both above and below, highly painful on being handled, very slightly compressible, and attended by an increase of the symptoms before-mentioned. As the patient appeared anxious and excited, I ordered him to lose eighteen ounces of blood, and a smart cathartic to be given. He was put on a very spare diet, and the bowels kept in a lax state.

January 3, 1829, the arm being laid on a table, I made an incision of five inches, extending from the lower part of the deltoid to within an inch of the outer condyle of the *os brachii.* On dissecting back the integuments, a tumour of a bluish white colour was brought into view. I found it occupying the fossa, formed by the insertion of the *deltoid* muscle above, the *triceps extensor cubiti* behind, the origin of the *supinator radii longus* below, and the *brachialis externus* within. Under the outer portion of the latter muscle part of the tumour had imbedded and attached itself, so that it became necessary to remove it. Having separated the tumour from its lateral attachments, I divided the nerve three quarters of an inch below it. The man instantly exclaimed that he had lost the power of raising his fingers, as well as the feeling in the outer part of the fore-arm and back of the hand. The dissection beneath was now easy, and I was happy to find that my fears of an adhesion to the periosteum were groundless. I lastly cut through the nerve at the like distance above the tumour, just as it emerges from beneath the bone. This was attended with pain, and, as the artery accompanying the nerve bled freely, a ligature was applied. The vessel seemed dilated and to be the *arteria nutriens* of the tumour. The wound was brought together by strips of adhesive plaster, over which graduated compresses and a circular bandage were applied. The limb was placed on a pillow in a relaxed position, the fore-arm and hand enveloped in flannel, and a bottle of warm water ordered to be constantly applied to the fingers.

January 4, second day. He passed but a restless night, notwithstanding the administration of two grains of opium yesterday evening. He complains of oppression under the sternum, and a sense of constriction across the lower part of the chest and præcordia, also of pains shooting up the right side of the neck in the course of the cervical nerves forming the brachial plexus. As the patient appeared agitated and the pulse rising, two pounds of blood were directed to be drawn from a large orifice, and an active purge was prescribed. By the evening copious evacuations had taken place, and he was composed.

3d day. He slept tolerably ; the pain was more concentrated to the left side of the thorax and right hypochondrium. A large blister was applied over these parts.—4th day. Much better. The strictest antiphlogistic plan was followed, and the bowels were kept well open by a saline mixture with the sulphate of magnesia.

5th day. About half the wound was found healed by the first intention. He now complains chiefly of an acute pain at the extremity of the right thumb nail, especially on its being touched. He has no feeling on the radial and outer side of the fore-arm, back of the thumb, and those fingers supplied by the dorsal branch of the radial nerve. It is curious that a well-defined limit exists extending as far as the middle of the ring finger; for the inside of this and the whole of the little finger, supplied by the ulnar nerve, are sensible on being pinched.—6th day. The wound is suppurating freely at the lower part. —9th day. The ligature came away. The patient sat up for a few hours. The wound is filling up by granulations at the lower part.

12th day. From this period nothing occurred to interrupt the cure of the wound, save an infiltration of matter under the integuments, towards the lower and outer side of the arm. This sinus being laid open, a free and depending opening was afforded. On the 29th day the patient was walking about, his arm supported in a sling, and his wound healed.—35th day. He has regained a slight use of the extensor muscles of the fingers. The numbness and want of feeling are gradually disappearing. Electricity in the course of the brachial nerves and stimulating frictions are now daily employed, and motion given to all parts of the limb. On the 16th April the patient was dismissed the hospital, with returning sensation in the back of the hand, and a tolerably free use of the arm.

How far the other nerves supplying the fore-arm and hand may contribute, by anastomosis as it were, in restoring the perfect use of those parts divested of the influence of the radial nerve, time must prove. Hitherto something of the sort seems to have commenced, and my expectations are the more sanguine, as to this date, June 2d, 1829, the man has not returned to the Naval Hospital.

The tumour on examination was found to consist externally of the thickened neurilema, extending from the nerve above the tumour as a capsule to the nerve below. This general tunic was of a lamellated structure, as viewed by the microscope, dense and inelastic, and of the colour of the *tunica albuginea* of the testis. Under this the nervous fasciculi appeared diverging and intersecting each other like net-work, to the thickness of half an inch. The rest of the mass consisted internally of a pulpy, striated, greenish-black matter, the striæ running from the circumference towards the centre, and surrounding minute interstitial cells filled with a similar medullary pulp or jelly. A small portion of coagulated blood was very distinct on one side in the firmer substance of the tumour. The centre was occupied by half a tea-spoonful of highly fetid coffee-coloured sanies. Condensed cellular membrane surrounded the whole of the tumour, which at the inner and lower side was firmly adherent to that part of the *brachialis externus* removed with it during the operation. The tumour was an oval of two inches and a-half in the long diameter, by nearly two inches across. This, with the portions of nerve divided above and below, brought the whole length of the extirpated part to four inches.

Observations.—That the blow received on the arm fifteen years ago was the primary cause of the chronic inflammation established in the radial nerve, most probably first in its neurilematic theca or capsule, there is little doubt; but that it should have once commenced, and then have lain dormant for the space of nearly thirteen years, is remarkable. This reproductive power I have had occasion to observe not unfrequently both in the mammæ and testes, arising either from a blow, the action of cold, or some peculiarity of the system at the time. The epididymis I have found to be the most speedily affected by this sudden change, particularly in dram-drinkers, and in those addicted to excess in venery. In these cases it appears to me that the sooner an operation is had recourse to, the better. The preparation of this rare and interesting tumour I have presented to the Hunterian Museum belonging to the Royal College of Surgeons of London.

[The case of Dr Gibbs is a valuable example of the large nervous tumour (Neuroma) described by Odier, Sir E. Home, and latterly by Dr Craigie and Mr William Wood. In the paper of the latter gentleman especially, some excellent cases of this disease are recorded.]

Art. III.—*Observations on the Ophthalmia Neonatorum, or purulent Ophthalmia of Infants.* By J. H. Wishart, Esq. F. R. S. E., Surgeon to the King in Scotland.

THE frequency of the occurrence of the purulent ophthalmia in infants, and the destructive nature of the disease to the eye as the organ of vision, will prove a sufficient apology for giving the following Remarks to the public, and for calling the attention of medical practitioners to the treatment of a disease which is so generally neglected by midwives and the women who have the charge of infants soon after birth. They are also intended to point out a mode of treatment which I am happy to say has very often proved successful, and has been the means of rescuing in many cases the unhappy sufferers from a state of comparative misery.

Purulent ophthalmia appears at various periods of life, but has been most frequently observed soon after the birth of the infant. Its first attack is marked by the following symptoms: About three, six, eight, or fourteen days, sometimes four or six weeks, after birth, one of the eyelids is frequently observed to be so glued down, that the child has a difficulty in opening the eye, which is marked by its making repeated efforts with the frontal muscle, in order to increase the action of the elevator of the eyelids. The eye is opened with more difficulty in a bright light, but is generally open in a moderate light, or if the room is darkened. The conjunctiva of the eyeball is not red; but on examining the conjunctiva of the eyelids, it is observed, chiefly from the tarsus to the part where it is reflected over the eyeball, to be slightly inflamed, puckered, and covered here and there with a white, mild, thick slime. This slime passes over the ball of the eye, and is collected in the space between the under eyelid and eyeball. In children a little older, and in adults, the disease is accompanied by an itching and rubbing of the eyelids.

As the disease advances, the difficulty of opening the eyelids, the intolerance of light, the redness and swelling of the conjunctiva, and secretion of mucus daily increase.

The eyelids at length remain more constantly shut, are glued more firmly to each other by the matter collecting on their edges, and encrusted by the exposure to the air, and they are no longer opened by the child even in a dim light. The skin of the upper eyelid then becomes red, and this redness changes to a livid colour when the child stretches itself or cries; at the same time, the muscles of the eye being affected with spasm, as well as the orbicularis, the ball of the eye is felt very hard, and like a ball moving below the finger. In this state, any attempt to separate the eyelids forcibly from each other would be unavailing, and only add to the sufferings of the patient, as the pain would be increased, and the efforts to close the eyelids would only be more violent. During sleep they may be opened more easily, after moistening the tarsi and eyelashes with lukewarm water. On separating them from each other, a quantity of mucus is discharged sometimes of a whitish, sometimes of a yellowish, or greenish yellow colour, often mixed with streaks of blood. In the worst cases it resembles bloody serum. The quantity of the mucous secretion depends partly on the violence of the attack or the gradual increase of the disease. The smaller the quantity of the discharge at this period, the milder and more limited the disease, and *vice versa*. It is more moderate at the beginning of the inflammation, more copious the longer it continues. The swelling of the upper eyelid is more considerable the longer the eyelids are allowed to adhere, and a proportion-ably larger quantity of matter flows out on opening them. The quantity of the discharge also depends on the nature of the constitution of the patient, and the degree of inflammation. When it is mild and white, less danger is to be apprehended from the inflammation; but it is always to be dreaded when the matter is greenish, or resembles thin bloody water. In severe degrees of the disease the upper part of the face is swelled, and the lachrymal sac, as well as the Schneiderian membrane, are affected. When the eye is completely cleaned and the eyelids opened, if the conjunctiva of the eyelids is much swelled, the conjunctiva of the eyeball is observed to be slightly inflamed, and the red vessels are never so numerous as to prevent their course being readily followed. On the other hand, the conjunctiva of the lids is of a deep red colour, swollen, and matter evidently oozing from and adhering to its surface. It not unfrequently happens that the eye is so overflowed by this matter before it is washed away, that it is impossible to distinguish any part of it. When the swelling of the conjunctiva of the lids is very great, if an attempt is made to raise the upper eyelid, it is turned out in such a manner, that not the smallest portion of the ball can be discovered.

Such attempts to open the eye are not unfrequently followed by a transient eversion *(ectropium)* of the upper eyelid, if the child begins to cry at the same time, and to make violent efforts to shut the eyelids. These eversions must be instantly replaced, otherwise the conjunctiva, if allowed to be exposed to the action of the air, will become more and more swelled, redder, and acquire the appearance of inverted *intestinum rectum*, so characteristic of the confirmed ectropium. In some very rare cases the eyelids remain everted, and if attempts are made with the fingers to replace them, they immediately return to the everted state when left to themselves. At this period infants express their uneasiness and pain by crying, and a constant restlessness day and night. They take the breast less eagerly, and are observed to dwine.

About this stage of the disease another symptom often appears, occasioning great uneasiness to the parents, viz. a discharge of blood from the eyelids. But this bleeding, so far from disquieting, is a welcome occurrence to the experienced practitioner, as the turgid superficial vessels are thereby emptied, and the swelling, redness, and pain diminish. The great swelling of the eyelids during the action of the orbicularis muscle, produces also a contraction of the edges of the tarsus, which prevents the matter accumulated under the eyelids being discharged. The long retention of this matter between the eyelids and ball causes it to become acrid, adds to the inflammation, and frequently produces opacity, and ulcer of the cornea, more or less obstructing the pupil. If the disease of the conjunctiva of the eyelids still advances, the hurtful influence of the matter with the pressure caused by the swollen eyelids is very injurious to the eyeball, the cornea is attacked and becomes ulcerated, and the ulceration frequently perforates it, and a prolapsus of the iris takes place, or the cornea swells, and forms the disease called staphyloma. If the rupture of the cornea is extensive, the whole of the iris is prolapsed, and forms the staphyloma of the iris; or when the cornea gives way, the humours of the eye are discharged, and a complete collapse of the eyeball follows.

The recovery from this disease is marked by the gradual return of the power of opening the eyelids, by the diminution of the intolerance of light, of the redness and swelling of the conjunctiva, and the cessation of the discharge. On awaking, if the hardened crusts are washed away with warm water, the infants open the eyes more easily, especially in a darkened room, or in the evening. The skin of the upper eyelid returns to its natural colour, the adhesion of the lids more seldom occurs, and the puriform discharge either ceases, or again becomes thin and watery, as in the incipient stage, and the disease ends with lachrymation; and towards the end of the fourth, fifth, or sixth week, all trace of the disease disappears, leaving only a weakness of the upper eyelid, and a tenderness and watering of the eyes on exposure to a bright light.

The violence of the symptoms varies considerably, and therefore it may be said that there is a *mild* and a *severe* degree of the disease; but it must be left to the judgment of the surgeon to determine to which class the particular case belongs. Both eyes are rarely attacked at the same time, generally the one after the other. The disease often reaches its greatest severity in one, while the other is unaffected. The sound eye is suddenly attacked, and the disease runs its course in proportion as it decreases in the first affected. However, in the progress of the disease, it is always observed that the cure is completed in both at the same time. In mild cases the healthy form of the eye is not injured by this disease. The only change which is observable at the latter period, if the eyes have been allowed to remain long agglutinated, and the cornea constantly macerated in the mucus, is a more or less extensive superficial obscurity or cloudiness of the cornea. This obscurity is confined to the corneal portion of the conjunctiva, and seems to arise merely from a slight separation of this membrane from the proper cornea, and it generally disappears without the assistance of art, as the eye recovers its healthy state. In the most violent cases, especially in those which have been neglected, the disease often occasions leucoma, staphyloma of the cornea or iris, and sometimes the complete destruction of the eyeball. In such cases the inflammation has not been confined to the conjunctiva of the eyelids, but has extended to that of the eyeball, to the cornea, iris, &c.

With regard to the causes of the purulent ophthalmia, weakly children are particularly liable to its attacks. It is more frequent in moist than in dry weather; more frequent in winter than in summer. Infants are more generally affected with it than children, and it is more rarely observed in adults. It is much more frequent in infants of poor and indigent parents than in the children of the wealthy. It is most common in the infants born in lying-in-hospitals or foundling hospitals, or in infants which are given out from such institutions soon after birth to be brought up by poor people, who are in indigent circumstances. I have repeatedly observed this disease appear in infants whose mothers have been affected with a mild leucorrhœa, not of a syphilitic nature, immediately previous to their lying-in. In infants born of healthy mothers, who have been carelessly exposed to cold, to a draught of cold air, in damp cold dwellings, especially if they are in the same room with damp linens hung up to dry, as also from being exposed to a bright light, as in the practice which some nurses have of dressing and undressing infants before a large fire. It very often occurs in scrofulous children after small-pox, measles especially, if they have been exposed to cold or damp weather. I do not mean to maintain that the purulent ophthalmia of those infants whose mothers are affected with a mild leucorrhœa (or whites as it is vulgarly called) are affected in the same way as in the case of syphilitic leucorrhœa; but I have observed it to be a fact, that more than two-thirds of the infants affected with this disease are born of mothers labouring under this mild leucorrhœa, though it is difficult to determine whether they are necessarily or only accidentally connected together. I have only met with one case of the purulent ophthalmia in the child of a lady in the higher ranks of life, and in this case I ascribe the disease to the same cause, the presence of the mild leucorrhœa at the time of delivery.

The late Mr Gibson of Manchester was struck with the coincidence of the purulent ophthalmia occurring in children whose mothers laboured under this discharge from the vagina; and he says, that, with very few exceptions, fluor albus existed in every case of the purulent ophthalmia; and he is disposed to consider these diseases as standing in the relation of cause and effect to each other, although he does not consider the fluor albus as the only cause of purulent ophthalmia. Beer is of opinion that the peculiar cause of this disease is the bad air surrounding such patients, and therefore that it is frequently endemic in lying-in and foundling hospitals, where numbers of children are crowded together, and the surrounding atmosphere much vitiated; and in Vienna, where the disease is very prevalent, the wet-nurses are often infected from the infants they nurse, and it is very fatal to their eyes in many cases.

Helling supposes that in most cases it arises from the sudden impression of a very strong light. How often do we see the hurtful effect of allowing the light to fall suddenly on the eyes even of adults, which have been unaccustomed to this stimulus. Mr Ware says that the purulent eye is supposed to arise from the child being imprudently exposed to the cold air; and he farther remarks, that he has seen it more than once attended with evident signs of a scrofulous constitution.

With regard to the course and termination of the purulent ophthalmia, the following prognosis may be drawn:—

1. It has always a certain duration, and never is removed in less than four weeks, although the most effectual mode of cure be adopted, but it often goes on six, eight, or twelve weeks, if the same unfavourable circumstances continue to operate. 2. It increases to a very great degree only, when the children are ill fed, and not screened from the influence of a cold, damp air, or improperly treated. The worst case is when the inflammation passes to the ball of the eye. 3. In many cases it leaves two morbid changes of structure, the one affecting the eye itself, the other the upper eyelid. These I have already stated to be the obscurity of the cornea and the ectropium. They only occur in severe cases, and are caused by unskilful management of the case.

Cure.—When we consider what I have stated as to the exciting cause of this disease, and the sentiments entertained on that point by other writers, we are very forcibly struck by the necessity of attending to the following points of practice: To remove if possible the leucorrhœa in the mother previous to delivery, and if this cannot be effected, to remove artificially as much of the discharge as possible from the vagina at the time of delivery, and to pay particular attention to the eyes of the child, by washing them carefully immediately after it is born.

The purulent ophthalmia from its beginning to its termination has a fixed course, which cannot be interrupted without injury to the patient; its duration, as has been mentioned in the prognosis, depends upon the constitution of the patient, and the influence of external agents. The mode of cure which I have uniformly found successful is the following:—

If the patient comes under my care in one or two weeks from its commencement, I immediately wash away the puriform matter which glues down the eyelids, with a little warm water; and then with a small conical pointed ivory syringe I inject the following eye-water :—

℞. *Sulphatis Zinci scrupulum, Aquæ fontis uncias decem ; Solve, et adde Liquoris subacetatis plumbi semidrachmam et Tincturæ Camphoræ drachmam vel drachmas duas. Misce et cola,*—

at first diluted with a little warm water, to bring it to a proper temperature, as it always answers best at first to use it tepid, especially in very cold weather. This is repeated three times a-day in ordinary cases, or every hour or two if the quantity of the discharge is very great, and is rapidly collected. In young infants the strength must be determined by the length of time they cry after the use of the collyrium. If the child continues to cry bitterly more than ten minutes, I consider it necessary to dilute the solution ; but although they cry violently during the time of the application of the remedy, I have generally observed that they are more easily pacified the more frequently it is used ; the degree of pain is also expressed by the contraction of the eyebrows and upper eyelid. The attendants are directed to prevent as much as possible the subsequent accumulation of the discharge by washing it away as soon as it is observed, with a little of the above-mentioned eye-water, and at night a little of the ointment of the oxide of zinc is insinuated between the eyelids ; and in general, although they cry very much during the washing, the ointment does not seem to give them any pain. In some cases, I have seen considerable benefit from the application of a single leech to the outer angle of the eye, especially when we suspect that the inflammation is extending to the eyeball.

In a few days the swelling and redness of the eyelids diminish, and then the ointment may be applied after using the eye-water. If, on attempting to open the eye the lids seem very turgid, or if a little blood is forced out by the pressure, the lids should be freely scarified, and the bleeding encouraged by fomenting with warm milk and water. If at this time, as frequently happens, the upper eyelid is everted, the scarification is the more easily performed ; but care should be taken to replace the eyelid as soon as it is done. This is readily effected by gently pressing the edge of the tarsus with the finger when the child ceases crying.

In the course of two weeks, if the cure goes on well, the swelling of the eyelid subsides, and the discharge acquires a watery appearance, as if mixed with the tears ; the infant opens its eyes for a short time in the evening, and they are only glued down in the morning. At this period I usually change the collyrium to a weak solution of the muriate of mercury, * with the addition of the vinous tincture of opium; the red oxide of mercury ointment may be substituted for the zinc ointment; and it may be applied three times a day, if the eyelids have still a tendency to adhere. At the end of a month it is generally unnecessary to continue the use of the syringe; but the eye should be carefully washed, by dropping a little of the collyrium into the hollow at the inner angle of the eye, and by gently separating the lids, it passes readily over the surface of the eye and lids.

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* R *Mur. Hydrarg. gr. i. Aq. Rosæ ℥vi. solve et adde vin. opii ʒiss. M. ft. collyrium.*

As it sometimes happens that the patient cannot be seen so often by the surgeon as the urgency of the case may require, and as the use of the syringe requires more skill and attention than the common attendants of children are capable of bestowing, I have found it necessary to direct the eye-water to be applied in the following manner:—A piece of soft sponge is to be dipped in the collyrium after it has been properly warmed; with this the edges of the tarsus are to be gently bathed, until all the hardened mucus is washed away, and the eyelashes separated from each other; the upper eyelid is then to be carefully raised, that the matter collected under it may be allowed to flow out. When the eyelid is thus elevated, the soft sponge is to be squeezed at the inner angle of the eye, that the fluid may pass over the conjunctiva and eyeball. Besides this, considerable benefit will be derived from fomenting the eyelids two or three times a day, and also during the night with the same collyrium. * The fomenting should be continued for nearly ten minutes each time; but the mother or nurse must be cautioned not to allow the cloths to become cold; and after fomenting the eyelids and surrounding parts, they should be carefully dried with a warm cloth; and during severe cold weather, compresses of two or three folds of soft linen should be applied over the eyebrows and cheeks to guard them from the cold.

In speaking of the prognosis, I mentioned two morbid affections which sometimes occur in the course of this disease, cloudiness of the cornea, and the eversion of the upper eyelid.

The first affection I have already spoken of more fully. I observed that the cloudy speck was confined to the portion of the conjunctiva covering the cornea, and seemed to arise from a slight separation of it from the proper cornea, and in most cases disappeared as the eye regained its healthy state. However, the removal of these opacities may be much accelerated by the use of the *vinum opii*, diluted at first with an equal quantity of water; afterwards it may be used undiluted. After a few days the weak precipitate ointment may be applied at night, and the *vinum opii* in the morning. These opacities in general are more speedily removed in very young patients.

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* The application of warm poultices is always attended with the most deleterious consequences.

With regard to the second affection, the ectropium, it in many cases requires more particular attention. The eversion only takes place when there is very considerable swelling of the conjunctiva of the eyelids. It may happen in this case either during a violent fit of crying of the infant, when a spasm affects the eyelids, and the swollen conjunctiva suddenly protruding everts the lid, or this protrusion and eversion may occur when the upper eyelid is forcibly raised in attempting to examine the eye. This eversion may be either *transient* or *permanent;* properly speaking, every eversion ought to be merely transient, as the eyelid ought to be immediately replaced after the crying has ceased, and consequently the permanence may be considered as a proof of want of attention on the part of the surgeon or the attendants, except in some rare cases. The *transient* ectropium requires no particular treatment except the immediate replacement of the lids. When it has unfortunately become *permanent* from the patient living at a distance, and not being properly watched by the attendants, the conjunctiva of the everted lid becomes firm, of a pale red colour, and frequently granular, and ceases to secrete from its surface.

Whenever the eversion does not disappear spontaneously, at least within twenty-four hours, (which often happens in children during sleep, when the protruded conjunctiva retracting itself draws the everted tarsus into its natural position,) an attempt must be made to replace the eversion. For this purpose, let the points of the thumb and fore-finger of both hands be dipped in mild oil, and let the everted lid be laid hold of with the fingers of both hands towards the inner and outer angle, and draw it slowly upwards, then suddenly downwards. By this movement the eyelid instantly resumes its natural position, and the eversion is removed. If the swelling of the conjunctiva of the eyelids is very great and the orbicularis palpebrarum violently contracted, the attempt to replace the lid may fail, in that case the finger must be applied nearer to the middle of the lid, and when the upper lid is raised up, both thumbs must be pressed on the swollen conjunctiva which is to be rubbed gently inwards.

If the ectropium has become *permanent,* first endeavour to remove the morbid change which has taken place on the conjunctiva before any attempt is made at replacement. This in general will be most easily effected by the application of the precipitate ointment, or the conjunctiva may be carefully touched with the nitrate of silver or the sulphate of copper, on alternate days.

In the course of eight, ten, or twelve days, the return of the conjunctiva to the healthy state takes place, and the swelling of it becomes lessened. As soon as this is observed, I again make the attempt to replace the eyelid; for the sooner the changed surface is withdrawn from the action of the air, the sooner will it return to the healthy state. The use of the precipitate ointment should be continued until the eyelid has completely regained its healthy appearance and functions.

When the mother nurses her child and the leucorrhœal discharge continues, I have given her the cubeb pepper with the view of communicating its beneficial influence to the child. We often see this medicine have a very speedy and decided effect in stopping this discharge, and perhaps it might in the same way arrest the discharge from the eyes in the infant. The number of my trials do not enable me to draw any positive conclusion, but I consider it perfectly safe, and would recommend any practitioners who have an opportunity for doing so to give it a trial.

Edin. 43, *York Place, August* 1829.

ART. IV.—*Observations on the variety of Dropsy which depends on Diseased Kidney.* By ROBERT CHRISTISON, M. D. one of the Physicians to the Royal Infirmary and Fever Hospital, and Professor of Medical Jurisprudence and Police in the University of Edinburgh, &c.

THE dependence of some cases of dropsy on a peculiar organic disease of the kidneys was lately pointed out for the first time by Dr Bright of Guy's Hospital, London, in his valuable Hospital Reports.* Since then I am not aware that any other physician has publicly noticed this discovery, or endeavoured to confirm or extend the statements of Dr Bright. Nevertheless his statements are of great interest; for according to my own experience and that of my colleagues in the Infirmary of this place, the dropsy which appears to originate in organic derangement of the kidneys is one of the most frequent of the varieties of that disease. In the course of a twelvemonth prior to May last, no fewer than about twenty cases have occurred in the different wards of our Hospital; and at the present moment five cases of the kind are under treatment.

The chief interest possessed by the instances to be detailed in the following remarks is derived from the circumstance, that they furnish the fullest confirmation of a great part of the novel observations and ingenious views of Dr Bright. In this respect they will not, it is hoped, be found unworthy of receiving publicity. Some of them, however, are also interesting, as they show more clearly than that gentleman succeeded in establishing,—the occasional presence of urea in the blood of persons labouring under the disease in question. Others are important in a strictly practical point of view, as they afford strong presumption that the pathognomic sign laid down by Dr Bright may present itself to the attentive search of the practitioner at a time when the organic derangement of the kidneys may be,—if not cured,—at least prevented from interfering with the right performance of their function.

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* Reports of Medical Cases, selected with the view of illustrating the Symptoms and Cure of Diseases, &c. 1827.

Case I.—*Robert Irving*, an out-pensioner of Chelsea Hospital, 58 years of age, of robust make and short stature, was admitted into the Infirmary on the 12th July 1828, on account of extensive œdema of the legs, and considerable enlargement of the abdomen. The legs pitted on pressure, and in the abdomen fluctuation was distinct. This affection was of three weeks standing. He was unable to assign any cause for it except general exposure to vicissitudes of temperature at his employment as a porter in the butcher-market. The œdema was not preceded by any pain in the loins or belly, or by nausea or vomiting; neither was there any such symptom at the time of his admission. The pulse, tongue, appetite, and bowels were in the natural state.

He had been at Walcheren in 1809, and after his return was attacked with ague, which made him an invalid for a twelvemonth. In 1814 a large abscess formed in the pit of the stomach, and about four pounds of matter were withdrawn by a puncture, the scar of which was at his admission evident three inches above the navel. His liver was at that time believed to be affected. He had a battered, dissipated appearance, and allowed he had led a very intemperate life.

The urine was natural in quantity, being 40 ounces daily at the time of his admission; and it yielded a copious flocculent precipitate when heated nearly to the temperature of ebullition. During the first seven days the urine was increased somewhat by the use of squill pills and a little mercury; but as the patient appeared to be making no progress under that treatment, digitalis was substituted for the squills on the 20th July. In a few days the urine increased to 100 ounces, and for at least three days after the 24th became merely hazy when boiled.

On the 15th August the œdema of the limbs was materially diminished. On that day I examined the urine with more care, and found it wine-yellow in colour, of a strong urinous odour, of the specific gravity 1014.5, again loaded with albumen, but evidently containing also a good deal of urea. In quantity it generally amounted to 110 ounces daily. The same treatment being continued, the swelling of the limbs had on the 22d greatly subsided, and that of the abdomen had also become materially less, although fluctuation was still perceptible. As the mercury had begun to affect his mouth, it was discontinued; but the digitalis was persevered in. From this time the urine increased rapidly to 130 ounces daily. On the 25th, the abdomen being then quite flaccid, and admitting of a careful examination, it was found that no local hardness or fulness existed in either hypochondrium. On the 30th the urine was 140 ounces, had a specific gravity of 1011.8, and, after having been for some days subsequent to the 22d rather less coagulable, had again begun to yield a very copious flocculent precipitate when heated. The œdema was so completely removed that he was able to do without bandages on the limbs, which he had never wanted till then from the time of his admission. Two days afterwards fluctuation was no longer perceptible in the abdomen.

On the 8th September he had a slight attack of dysentery, which at that time prevailed in the hospital in a very malignant form. It was easily checked in his instance, however, by opium. The urine was still about 140 ounces daily, and gave a copious precipitate when heated. The digitalis was continued. Subsequently the urine began to diminish slowly in quantity, so that on the 12th it was 110, and on the 16th 96 ounces; but the œdema and ascitical swelling were all this time hardly perceptible. On the 12th the urine was examined with care. From the particulars stated below * it will be seen that the specific gravity had increased, and that it contained only half the natural proportion of urea and salts, and a large proportion of albumen.

Hitherto his progress was steady, though very slow. But

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* On the 30th August, when the quantity was 130 ounces daily, the specific gravity was 1011.8.

On the 12th September, the quantity being 110 ounces, the density was 1013.4, the solid contents 29.8 per thousand, of which 20.4 were urea with a small quantity of animalized acetates, 3.7 were alkaline muriates, sulphates and phosphates, and 5.1 dry albumen, the rest being water. The quantity of earthy phosphates was inappreciable.

As a point of comparison for this and other experiments, the following analysis of healthy urine may be given. When the quantity was 35 ounces daily, the average specific gravity was 1029, and the solid contents 67.7 per thousand, of which 55.2 were urea and animalized acetates, 11.1 alkaline muriates, sulphates and phosphates, 1.0 earthy phospates and sulphates, and 0.4 vesical mucus. The urea with the associated acetates is separated by strong alcohol; the alkaline muriates, phosphates, and sulphates are obtained from the residue by means of the action of water; and from what then remains the vesical mucus is removed by potass, after which nothing is left but insoluble earthy salts. A more refined analysis appeared to me unnecessary.

from this time his state retrograded. On the 22d the œdema had returned in the thighs, and the abdomen was again somewhat enlarged and indistinctly fluctuating. Nevertheless the urine continued to be passed in the quantity of 90 ounces daily. Its specific gravity was increased; and although this was partly owing to an increase in the proportion of urea and salts, the albumen had increased in a much greater proportion.* On the 29th the dropsical effusions had increased still farther, the urine had been for some days only 48 ounces daily; and although its density had not increased, the proportion of albumen was sensibly greater.† For three or four days he had also been affected with cough, which had become harsh, loud and husky, and attended with scanty, difficult expectoration of clear and not particularly viscous mucus. This was the first occasion on which he had any pectoral complaint in the hospital. The pulse was natural. A squill mixture was prescribed as an expectorant, and two days afterwards the digitalis was discontinued, squill pills and supertartrate of potass being ordered instead of it, the latter in the dose of two drachms in half a pint of water three times a-day.

This plan was commenced on the 30th. The urine, however, continued scanty, varying from 30 to 40 ounces. On the 6th October, as he complained of weakness and want of appetite, he got at his own particular request some bark powder. But on the 11th it was discontinued on account of symptoms of a head affection, which those, who have perused Dr Bright's reports, or had personal experience in this disease, cannot fail to regard always with a suspicious eye. He had gradually increasing dimness of vision and a sense of weight and pain in the forehead on coughing or stooping. The dropsical swellings had also greatly increased, and his cough was not any better. The specific gravity of the urine was 1018.3. His diet was immediately reduced; the squill and supertartrate of potass were at the same time omitted, and the digitalis and mercury resumed; and as the pulse was 84 and firm, twelve ounces of blood were taken from the arm. The blood was buffy, not cupped, and its serum had a specific gravity of only 1019.2, and merely gelatinized when heated. Although the urine was not increased next day, the swelling of the abdomen was much reduced. On the 15th, his headach continuing, and the dimness of sight having increased, twelve leeches were applied to the forehead, with much relief to the headach. On the 16th the dimness of sight continuing, and the pulse being firm, venesection was repeated to sixteen ounces. The blood was not buffy, the crassamentum was loose, the serum of the specific gravity 1020, and holding only 68.3 parts per thousand of solid matter dissolved. Before the bleeding the urine was 36 ounces, and nearly in the same state as on the 29th September; after the bleeding its quantity was not augmented; but its density was considerably increased, and the albumen had increased in a greater proportion than the other ingredients.* Both the abdominal swelling and œdema were much diminished; and the cough, headach, and dimness of sight were also relieved. On the 19th the digitalis was increased.

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* On the 22d September, the quantity being 93 ounces, the density was 1016.4, and the solid contents 36.9 per thousand, of which 23.7 were urea and acetates, 4.4 alkaline muriates, sulphates and phosphates, and 7.9 dry albumen.

† On the 29th September, the quantity of urine being 48 ounces, the density was 1016.3, and the solid contents 38.6 per thousand, of which 24.7 were urea with acetates, 4.2 alkaline muriates, sulphates and phosphates, and 9.1 dry albumen.

From this time till the 26th no material amendment took place; and on that day he began to complain of nausea and increased dimness of sight, and the pulse became feeble. The digitalis and mercury were therefore discontinued, and instead of them he was directed to take supertartrate of potass as formerly. In four days the urine under this system was increased to 60 ounces; and at the same time the dimness of the left eye was diminished; but that of the right eye remained the same as before, and the pupil was distinctly dilated. Half a drachm was added on the 30th to each dose of the supertartrate.

On the 2d November the urine was 80 ounces daily, and almost free of coagulation when heated, a faint haze only being caused. His cough and dyspnœa, however, had been gradually getting worse for two days previous, and I found on carefully examining the chest, that both lower dorsal regions were dull on percussion, and the respiratory murmur inaudible, while in the upper dorsal and whole anterior regions the sound on percussion was natural, and the respiratory murmur distinct and sonorous. As his cough excited pain under the sternum, a large blister was applied and an opiate mixture given with marked advantage. On the 5th the urine was 90 ounces daily, but again very coagulable. On the 10th the pectoral symptoms were much less troublesome; the respiratory murmur was heard in both lower dorsal regions, was puerile in the right lateral and indistinct and crepitating in the left lateral region, the latter being the side on which he commonly lay. By this time the œdema and ascites were somewhat diminished, and he passed 100 ounces of water daily. On the 11th the urine was again not coagulable by heat, but merely rendered hazy. On the 17th the dropsical swellings had subsided very considerably. After this the urine gradually decreased to 60 ounces daily, which continued to be its average till his dismissal. His diet was now extended. After the 28th, the dose of supertartrate of potass was gradually lessened, and on the 27th of December it was discontinued altogether.

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* The quantity of urine being 36 ounces, its density before the bleeding was 1016.3, its solid contents 39.3 per thousand, of which 23.3 were urea with acetates, 6.5 alkaline muriates, sulphates, and phosphates, and 9 2 albumen. After the bleeding the density was 1019.1, and the solid contents 46.5, of which 27.2 were urea with acetates, 8.4 alkaline muriates, sulphates, and phosphates, and 10.8 albumen.

On the 2d January 1829 he was dismissed at his own desire. At this time he had been three weeks without any œdema and a fortnight without any swelling of the belly. For some days after the 11th November the urine continued free of albumen; after that its state was lost sight of till the 28th, when it was again found to coagulate as copiously as ever; and it was of the same nature at his dismissal. His head affection had entirely disappeared, except the dimness of the right eye and dilatation of the pupil, which were little altered after the 30th October. His pectoral complaints had been very trivial for five weeks before he was dismissed.

On the 26th of February, seven weeks after leaving the hospital, this man was readmitted, and became a patient of Dr Alison in the clinical ward. I am indebted to Dr Alison for the account of the sequel of the case, and of the appearances found on examination of the body.

At his readmission the œdema and ascites were considerable, but not so great as when he was under my charge. He had severe pain of the head, much confusion of thought, squinting to the right side, dimness of sight, dilatation and sluggishness of the pupils, impaired power of motion in the limbs; also pain in the epigastrium increased on coughing and pressure, and pain and tenderness in the region of the fifth dorsal vertebra. The pulse was frequent and feeble; the tongue clean; the bowels slow; the urine moderate in quantity, and coagulating abundantly by heat.

He was reported to have been suddenly seized three weeks after his dismissal with headach, pain in the stomach and bloody vomiting, followed by loss of memory, impaired motion of the extremities and imperfect articulation.

The treatment adopted by Dr Alison consisted in the frequent administration of laxatives, the employment of powder of digitalis, and a trial of depletion to a moderate extent the day after he was admitted. Under this method his headach and pain of back were much relieved; and on the 1st of March the urine was somewhat increased. The dropsical swellings, however, were not materially lessened; and although he was at times more collected, he generally passed his evacuations unconsciously, and was drowsy and confused.

On the 10th March he was attacked with a fit of convulsions and increased stupor and dilatation of pupils. A blister was applied to the head, and ten ounces of blood were taken by cupping from the temples. The convulsions ceased, but he then became delirious at intervals. On the morning of the 10th the delirium increased, and was followed by spasmodic contraction of the arms and increased stupor. The pulse became slow and feeble; the spasms returned several times in the course of the day; and at one next morning he expired.

Inspection.—In the head there was slight effusion between the arachnoid and pia mater; the substance of the brain was unnaturally hard, and when cut showed more bloody points, and poured out more serum than usual. The lateral ventricles contained several drachms of fluid, the left most; and the *foramen* of Monro was more open than natural. In the left ventricle, behind and on the outside of the *optic thalamus* there was a large, soft, brownish tumour, which displaced the *fornix* and extended into the descending *cornu*, which, as well as the posterior cornu, was much enlarged. The medullary matter around it was much disorganized, being softened and broken down. The *corpus striatum* and *choroid plexus* were healthy. A tumour of a similar nature had commenced in the same situation in the right ventricle.

The abdomen contained several pounds of serous fluid. The right lobe of the liver adhered strongly to the diaphragm, but was perfectly healthy in its structure, and did not present any trace of an abscess having ever existed in it. There was no adhesion of any internal organ to the peritonæum opposite the external scar. Both kidneys were unusually small, hard, pale, and scabrous; the cortical part was pale and granulated; and a great part of the tubular portion was disorganized by a deposition of grayish yellow matter, and did not retain its fibrous structure. The other viscera were in the natural state.

In the chest there was found considerable serous infiltration of the lungs. The heart was healthy.

Case II.—*Francis Magee*, aged 57, a weaver, at the time of his admission into the Infirmary on the 5th August 1828, had been affected for three weeks with considerable œdema, and some swelling and firmness of the belly. He had also occasional vomiting in the morning, and dull pain on pressure in the pit of the stomach and along the margin of the ribs on the right side. He had likewise frequent cough, with difficult expectoration of tough opaque mucus, and considerable difficulty of breathing. The chest sounded everywhere loudly on percussion; and both acts of respiration, but particularly expiration, were prolonged, inspiration being also indistinct, expiration distinct, sonorous and sibilant. The pulsation of the heart could not be felt with the hand when he lay on the left side; and with the stethoscope both sound and impulse were feeble. The pulse too was feeble and only 52 in the minute. The tongue was furred and breath fetid; the bowels required the frequent use of laxatives; the urine was of natural quantity, but exceedingly pale, being of the lightest possible straw colour, and depositing a moderate quantity of white flakes when heated.

His pectoral complaints were of eight years standing, and began subsequently to the healing of an old ulcer on the leg, which had been occasionally healed, though only for a few weeks at a time, during twelve years previous to its final cicatrization. About a year before his admission into the hospital his breathing got worse, so as to annoy him when at work. About that time he had also a comatose attack, which lasted a-day and was removed by blood-letting. After that his urine had been always pale but natural in quantity. For two months before he entered the hospital he had pain in the loins, difficulty in passing urine, and frequent attacks of vomiting.

He was ordered ten drops of tincture of digitalis thrice a-day in an ounce of infusion of cassia, and likewise a mercurial pill every evening. Laxatives were also given from time to time. On the third day of this treatment the urine was 104 ounces, and had a specific gravity of 1007.9. The œdema was lessened; and the action of the heart both to the hand and to the stethoscope was natural, though rather feeble. On the 11th August the œdema was gone, the ascites nearly so; but his breathing was as laborious as ever, and he complained of pain round the whole lower margin of the chest, particularly in the loins, where pressure made the pain shoot towards the stomach. The digitalis was discontinued, and a squill mixture ordered in its place.

From this time the urine began to decrease in quantity, till on the 16th it was only 40 ounces daily. Its specific gravity was 1008.4, it was as colourless as ever, coagulated more abundantly when heated, and contained very little urea. There was no return of the dropsical swellings, but his difficulty of breathing and cough were not in the least relieved. Next day the breathing was worse. He also became affected with headach, drowsiness, contracted pupil, some livor of the face and tremors of the hands. The pulse was 60 and full, and the tongue brown on the centre. Fourteen ounces of blood were therefore taken from the arm, with some relief to the dyspnœa; and the blood was very buffy in one cup. The squill was now abandoned and the digitalis resumed. On the 18th the symptoms connected with the affection of the head were rather increased, and he was feeble and much exhausted. The urine was only fifteen ounces. A brisk laxative and a purgative enema were ordered, leeches were applied to the temples, and subsequently a blister to the head; but without any advantage. His stupor and tremors got gradually worse and worse; he complained of tenderness over the whole belly; the urine on the 19th was only twelve ounces; on the 20th twelve ounces were withdrawn by the catheter. On the morning of the 21st he died.

The whole urine passed during the last thirty-six hours of his life was two ounces. This had precisely the same external qualities as the urine previously passed, but had rather a higher specific gravity, namely 1009.5. *

Inspection.—There was very little œdema of the limbs. The face was not livid, and the scalp was free of blood. The sinuses of the dura mater contained only a moderate quantity of blood; the arachnoid and pia mater, as well as the substance of the whole brain, were remarkably destitute of blood, and blanched. There was not above half a drachm of fluid in each lateral ventricle, and half an ounce in the base of the skull. Even in the base of the brain the vessels were unusually empty of blood. The cortical matter of the brain appeared less in thickness than natural. In the middle of the left *thalamus*, half an inch behind the anterior commissure, there was a cavity which would have held a cherry-stone; it was crossed by filaments of cellular tissue, walled in by a thin partition of condensed cerebral substance, but not surrounded by redness or softening.

The pericardium and base of the left lung adhered to the pleura of the ribs by very old adhesions; and four ounces of clear serum were contained in the pleural sac of that side, but none in the pericardium. The posterior part of the lower lobe was very œdematous. The walls of the left ventricle of the heart were somewhat thickened and its cavity contracted. The aorta was slightly and uniformly enlarged at the arch, and its whole inner membrane thickened, hard, and wrinkled,—the valves being also involved in this change of structure. On the surface of the right lung there were many old adhesions to the ribs; and in its substance a great deal of œdematous infiltration. The fore part of both lungs was gray, strongly crepitant when handled, and slightly emphysematous,—the whole air-cells being somewhat enlarged. The nature of their structure in the posterior part could not be ascertained on account of their state of infiltration. The greater bronchial tubes were filled with mucus. The blood was everywhere black and fluid.

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* It contained 23.9 parts per thousand of solid matter, of which 14.7 were urea with acetates, 4.6 alkaline muriates, sulphates and phosphates, and 3.5 albumen. The earthy phosphates were inappreciable.

The stomach and intestines were healthy. The spleen was pale reddish-brown, firm, and composed of little radiated masses, (not unlike the mineral Wavellite in appearance.) The liver was somewhat larger than usual, but in structure perfectly healthy. The kidneys were both much diseased. The right was rather less than natural, externally rough with small irregular nodules and of a pale grayish-brown colour, internally of a pale grayish-yellow tint. The *tubuli uriniferi* were much nearer the surface than in the healthy kidney, greatly diminished in size, and pushed as it were outwardly by a deposite around the *pelvis* of grayish-yellow, indistinctly granular matter, into which also the whole cortical substance was converted, so as to have lost its usual fibrous appearance. Even the fibres of the *tubuli* were unusually pale, and the yellow matter was deposited among them. The pelvis of the kidney was small, the ureter pervious. The left kidney was very much diminished in size, flattened and flabby. Its cortical substance was in the same state as that of the right kidney, but rather darker, and with a few distinct tubercles; and some grains were softened. The tubular portion was of a dark brownish-red colour, and not fibrous at all; and it contained several small watery cells, apparently the remains of the infundibula. The ureter was pervious. The capsular fat of both kidneys was indurated, and the tunica propria thickened and adhering.

Analysis of the Blood.—About an ounce of blood was collected from the vena cava by an incision in the loins, great care being taken to keep it clean and pure. It was black, fluid, and nearly free of the odour of putrefaction. It was heated in a vapour-bath at a temperature a little under 212, and rapidly stirred as soon as it began to coagulate. A thick, brownish-red, granular mass being thus formed, a little distilled water was added; and after agitation, the whole was filtered. A cherry-red fluid passed through, which at 212° deposited more brown flakes and became wine-yellow in colour. This was evaporated nearly to dryness in the vapour-bath at a temperature beneath 212°, during which a fetid odour was exhaled, exactly the same as that of the patient's breath during life. Just before the fluid began to acquire a syrupy consistence, a drop of it was treated with nitric acid, which rendered it opaque and caused considerable coagulation; but crystals were not formed. The syrupy extract, when acted on by boiling alcohol, gave a pale wine-yellow solution, which was evaporated in a small glass vessel till it began to thicken. This extract had the same fetor.

On the addition of a few drops of nitric acid the same odour was exhaled from it as from extract of urine when similarly treated; and immediately fine, grayish-red, flaky crystals of a pearly lustre were formed in abundance, so as to thicken the whole mass. These were evidently scales of nitrate of urea.

Case III.—The next case bears a striking resemblance to the last in many respects; and on that account I regretted much that the friends could not be persuaded to consent to an examination of the body. Notwithstanding this material deficiency in the history of the case, it presents some interesting points for the consideration of the physician.

James Thomson, aged 53, a travelling hawker, was admitted into the Edinburgh Infirmary for dropsical and pectoral complaints, on the 22d August 1828. Four months before, he had an attack of jaundice, of which he was cured in six weeks by laxatives. After enjoying tolerable health for a month, he was seized with dropsy and difficult breathing, which rapidly increased, till in ten days he was as ill as when he entered the hospital.

At the time of his admission he was affected with much dyspnœa, which was easiest when he lay horizontally, and with frequent cough, accompanied by scanty, clear expectoration. The chest sounded well on percussion everywhere, perhaps unusually loud in front. The respiratory murmur was every where sibilant or sonorous, obscure in inspiration, distinct in expiration, prolonged in both, but particularly in expiration. The pulsation of the heart was diffuse, but not unnaturally extensive. In the neck there was remarkably distinct pulsation of the jugular veins. The limbs were œdematous below the knee. The abdomen was considerably enlarged, tense, fluctuating, tender, especially along the margin of the ribs on both sides, so that it was impossible to ascertain whether any deep-seated hardness or tumour existed. The pulse was 96, full and firm; the tongue whitish, with considerable thirst; the skin of natural warmth, and leucophlegmatic. The urine amounted to thirty ounces daily, had a dirty reddish-brown hazy appearance, deposited a considerable sediment of vesical mucus, emitted a faint urinous odour, and when heated gave a considerable flaky precipitate. Its specific gravity was only 1009.1; and it contained only 22.8 parts per thousand of solid matter, of which 16.9 were urea with animalized acetates, 3.3 alkaline muriates, sulphates, and phosphates, and 1.5 albumen. The quantity of earthy phosphates was inappreciable.

Three weeks before his admission he had just recovered from a severe mercurial course, which did him no good. He admitted that he had been in the habit of taking rather more whisky than other workmen, but denied that he was addicted to intoxication. He had no recollection of having ever suffered from dysuria or lumbar pains; but had been long liable to stomach complaints.

He was immediately ordered to be bled to the extent of sixteen ounces, from which he experienced considerable relief to his pectoral symptoms. The blood was not buffy. The serum had a density of 1024.8, gave a less firm coagulum when heated, had only 81.2 parts of solid matter per thousand, and contained a substance which possessed almost all the properties of urea. The analysis will be stated at the end of the case, in order not to interrupt the narrative. Next day a blister was applied to the breast, digitalis was prescribed to the extent of ten drops thrice a-day in the infusion of cassia, and some laxative pills were given, which he was instructed to take occasionally, for correcting a constant tendency to constipation.

On the 25th the urine was 40 ounces and less turbid. On the 27th the pulse had fallen to 64, the belly was less distended, and the tenderness was confined to the epigastrium. The urine, however, had not increased in quantity, and his dyspnœa was as severe as ever. A mercurial pill every night was added to the other medicines in order to promote the action of the digitalis. On the 29th the digitalis was discontinued, as he was attacked with vomiting, and complained of seeing strange objects. The urine had not increased in quantity, was 1009.1 in specific gravity, and coagulated abundantly when boiled. The pulse had fallen to 58, and continued to sink gradually to 45, which state was attended with much faintness and exhaustion. A little port wine was accordingly ordered, and on the 1st September an anodyne; at the same time the supertartrate of potass was directed to be taken as mentioned in page 265. His dyspnœa meanwhile had rather increased, and the tenderness in the loins had returned. No hardness or swelling could be felt in the right hypochondrium. Next day, after a refreshing sleep, the pulse was found to be 100, full, and very easily compressed; the skin hot; the countenance oppressed; and the urine passed in twenty-four hours only amounted to eight ounces. The wine and opium were discontinued. In the evening the oppression amounted to stupor, the pulse became slow and feeble, and the pupils contracted. After the action of a purgative clyster he slept quietly, passed above twenty ounces of urine, and on the 3d felt better, except that his exhaustion had increased. The pulse was 48, feeble and irregular; and the countenance flushed. His exhaustion and stupor went on gradually increasing from this time, and were only relieved for a brief interval by the action of a cathartic. At mid-day of the 4th he was excessively soporose, but could be roused; at four he was complete comatose, and at midnight he died without any other symptom of note. Very little urine was passed after the morning of the 3d, and that only when he was at stool.

Examination of the Blood.—Blood was drawn from the arm on the 23d, as already noticed; and the serum was examined for urea. The specific gravity of the serum was 1024.8, and when heated it formed a coagulum of rather less firm consistence than natural. Its solid contents when thoroughly dried in the vapour-bath were 81.2 per thousand. The serosity procured by repeatedly boiling in water the residue of its evaporation, was evaporated to dryness in the vapour-bath, and the matter left was boiled in pure alcohol. When the filtered solution was concentrated by evaporation numerous crystals were formed, acicular, transparent, colourless, and very deliquescent. These were dissolved in a few drops of water, and then treated with a little nitric acid. The same smell was exhaled as from the action of that acid on extract of urine, and in two or three minutes colourless silky acicular crystals were formed in little radiated masses. (See afterwards, p. 285.)

A comparative analysis was made of the serum of blood taken from a young woman who was feigning sickness. The serum had a specific gravity of 1030.8 and contained 102.2 parts of solid matter per thousand. The alcoholic solution procured, as in the former instance, from this solid matter, gave by evaporation granular crystals, the solution of which in water did not crystallize on the addition of nitric acid.

Case IV.—*Murdoch Campbell*, aged 27, a labourer and night-watchman, tall in stature and of robust habit, was admitted into the Infirmary on the 30th April 1828, on account of erysipelas of the right leg of a few days' standing, which commenced soon after his having been dismissed from the clinical ward cured of slight rheumatism. He had a similar attack some years before, which ended in suppuration; and over the inner ankle an aperture was at that time formed, the scar of which was obvious. The tibia was also considerably enlarged above the ankle.

From this state he soon recovered in a day or two under low diet and the use of laxatives. On the 3d May my attention was drawn towards him more particularly by his leucophlegmatic appearance. On careful examination there was found general puffy swelling on both sides of the neck, with enlargement of the glands at the angles of the jaw, slight swelling of the abdomen, some difficulty of breathing, and œdema of both legs, especially the right. He had no sickness. The urine was reported to be scanty. The pulse was 84 and strong, and he had a good deal of general oppression. He was immediately ordered to be bled till fainting approached, and thirty-four ounces were drawn before he became sick. The blood was very buffy and much cupped. The breathing was immediately much relieved, and next day the pulse was 60 and soft. But at noon, although there was no swelling above the pubes, he had not passed any water for thirty hours; he complained of umbilical pain on pressure and of tormina; and there was considerable somnolency. A dose of Epsom salt was ordered, and also a common injection.—Next day, the 5th, he had passed 60 ounces of urine, and felt generally better; but the somnolency and umbilical pain continued, and the abdomen was increased in size. The puffy swelling under the jaw, however, had disappeared. A drachm of spirit of nitric ether was ordered thrice a-day in a cup of water.—On the 6th the somnolency was less, but the umbilical pain was worse; and therefore, as the pulse was natural, sixteen leeches were applied near the umbilicus, but with little relief.—On the 8th the urine was only from 16 to 20 ounces daily, and of a light straw colour; and it deposited a pretty copious fleecy precipitate when heated. The œdema was undiminished. Twelve leeches were now directed to be applied to the loins; two drachms of supertartrate of potass three times a-day were substituted for the ether; two squill pills morning and evening were also added; and as he complained much of the hospital diet disagreeing with him, he was ordered tea instead of porridge, and beef-tea instead of broth.

On the 9th he was decidedly worse. The tenderness of the abdomen had increased and spread along the whole margin of the ribs, except in the region of the loins. The puffiness under the jaw, the general œdema, and the leucophlegmatic appearance, which had been slowly gaining ground for three days, were augmenting much more rapidly; and he had more somnolency, with considerable headach over the eyebrows. The pulse was 80, full and firm, the tongue clean, the bowels slow, the urine 28 ounces and more coagulable by heat. He was then ordered a little croton oil with colocynth pills, and directions were given to bleed him again till the approach of fainting. Thirty-six ounces of blood were drawn without inducing sickness, and the blood was very buffy and much cupped, except in the last of five cups, which was natural. He experienced great relief to the pain in the abdomen, the headach ceased, the somnolency abated, and the pulse fell to 70. The croton operated sufficiently. The urine was only 28 ounces, pale, considerably loaded with albumen, and of the specific gravity 1016.—On the 11th I learned that the abdominal pain had again become severe on the previous evening, and that an unsuccessful attempt had been made to repeat the venesection, for which conditional orders had been left.

His somnolency had increased, and the pulse was full and firm. Blood was ordered to be drawn by cupping from the loins to the extent of fourteen ounces; and from this great relief was obtained both to the somnolency and abdominal pain, which in consequence became confined to the umbilicus, and was not felt except on heavy pressure. The urine during the next twenty-four hours was 24 ounces, and fully more coagulable.

On the 13th the squills and supertartrate of potass were abandoned; and ten drops of tincture of digitalis were ordered in an ounce of infusion of cassia thrice daily.—On the 17th the urine was from 20 to 30 ounces daily, and more coagulable. Occasional saline laxatives had been given to correct a tendency to constipation. The digitalis caused slight nausea. The swelling of the neck and abdomen had diminished, that of the limbs was unabated.—Next day the somnolency returned. Sixteen ounces of blood were therefore directed to be withdrawn from the loins by cupping; and the digitalis was ordered four times a-day. The somnolency was removed by the cupping, and the abdominal pain was farther relieved.—On the 20th the urine had increased to 36 ounces; but the patient complained of headach, giddiness, and sickness towards evening for four days afterwards. The pain of abdomen all this time was constant, dull, confined to the epigastrium and increased on pressure; but no local fulness or hardness could be discovered.—On the 25th the abdominal pain was more severe and extensive. Twenty leeches were therefore applied to the epigastrium, but without any relief. Next day the pain was worse, the pulse 80 and firm, the urine 30 ounces. Venesection was accordingly again repeated till syncope approached; and forty ounces of blood were drawn, which was excessively buffy, concave, and contracted in every cup. From this he experienced very great relief. The somnolency ceased, the pain disappeared almost entirely, and the abdomen was much diminished in size. At the same time the urine, which was 30 ounces daily, became much less albuminous, as it was merely rendered hazy by heat. A mercurial pill was then ordered with the digitalis.—On the 29th the improvement continued progressive. The leucophlegmatic appearance of the skin, as well as the œdema, had diminished every where; and the urine was 50 ounces daily. He still, however, had some tenderness in the epigastrium.

On the 1st of June the mercury was abandoned, as the gums had become tender. The pain still continued to be felt in the epigastrium, especially on firm pressure. The urine was about 60 ounces daily, and it gave but a faint haze when boiled. On the 3d it was 75 ounces. The mercurial fetor was strong and the mouth very tender, but there was not any salivation. The bowels required occasional laxatives; but their effect was very uncertain, sometimes operating mildly, sometimes occasioning severe tormina and diarrhœa, so as to render the use of opium necessary.—On the 5th the urine was 40 ounces, and again slightly coagulable by heat. The abdominal pain had entirely ceased.—On the 8th the diarrhœa was very troublesome, and the digitalis excited nausea at each dose. It was therefore discontinued.

Next day, the 9th, he felt much better. There was now no abdominal pain of any kind; no swelling of the belly; and the œdema and leucophlegmatic appearance of the skin had everywhere disappeared. The urine was natural in quantity, and hardly became even hazy when heated; but it retained its pale colour. His medicines were then omitted.—On the 15th the urine was from 20 to 30 ounces daily, pale, but quite clear when boiled. Diarrhœa had again recurred after some laxative pills and was checked by opium. His diet had been for some days enlarged a little.—On the 19th, as he continued to improve progressively he was allowed a beef-steak daily, and the full diet allowance of other articles.—After suffering during the next ten days several attacks of diarrhœa whenever laxatives became necessary, he was on the 30th quite well, his countenance was natural, and his strength had improved very much. The urine meanwhile was towards 60 ounces daily, pale, and either not changed at all by heat or rendered but slightly hazy. His diet was enlarged still farther.—He was kept for security's sake another month in the hospital, during which he became florid, fleshy, and active. On the 28th July he was dismissed; and at that time the urine was natural or rather abundant in quantity, being commonly about 50 ounces daily, and it had been for many days entirely free even of haziness when heated; but it continued unnaturally pale, though less so than on the 30th June.

I regret exceedingly that it was out of my power to learn what afterwards became of this man, as he went to the island of Skye immediately after quitting the hospital.

Case V.—For the particulars of the following valuable case, where a still more perfect cure was accomplished than in the one just related, I am indebted to the kindness of my colleague Dr Gregory.

Marion Clinkscales, aged 28, was admitted into the Infirmary on the 4th March 1829, under Dr Gregory's charge, for dropsical complaints. She had considerable œdema of the limbs; some enlargement of the abdomen, with fluctuation, and tenderness on pressure in the umbilical region; also difficulty of breathing in the horizontal posture, or on any unusual exertion. The pulse was 96 and rather feeble, the tongue whitish, the bowels regular, the catamenia suppressed for six months, her appetite impaired, and her sleep disturbed towards morning by uneasiness in the abdomen. The urine was reported scanty but was pretty copious during the first day after she was admitted; it was very pale and became turbid with the deposition of a flaky precipitate when heated.—The œdema commenced four months before her admission and two months after delivery, the swelling of the abdomen several weeks afterwards, and the abdominal pain some weeks after that. The pain was at first in the right hypochondrium and stretched towards the top of the sternum, and it was attended with frequent palpitation in the night-time. She ascribed her complaints to her having sat on a cold stone by the sea shore a few days before her legs began to swell.

The treatment consisted chiefly in one blood-letting, and the administration of half an ounce of supertartrate of potass every morning, together with a pill twice a day which contained a grain of squill powder and half a grain of digitalis. The blood was drawn on the 5th, when the pulse was 88 and of good strength, to the extent of twelve ounces, and it was not buffy. —Next day the uneasiness in the abdomen and dyspnœa were gone, and the œdema of the limbs had abated. The pulse was 88 and the tongue clean. The urine, of which 32 ounces had been passed, no longer became even turbid when heated, and it was rather high-coloured.—On the 7th the urine was 70 ounces, pale and not coagulable; and the abdomen had decreased somewhat in size.—On the 8th and 9th the daily quantity of urine was about the same, there was still fluctuation in the abdomen; but very little œdema remained; and the pain of abdomen had not returned. On the 10th and 11th the quantity of urine was about 100 ounces daily, free from haziness when heated, and of natural colour and smell. On the two next days it was 70 ounces daily, and the pulse had now become natural.—On the 20th she continued free of complaint; there was no longer any œdema of legs or fluctuation in the abdomen. The urine was natural in quantity and colour, and did not coagulate. As she wished to leave the hospital she was dismissed on that day. (See afterwards, p. 290.)

Case VI.—The next case is chiefly interesting on account of the appearances found after death, as will be afterwards explained under the general remarks to be made upon all the cases. The particulars are obligingly communicated by my colleague, Dr Home, in whose clinical ward the patient was treated.

John Johnson, æt. 38, a weaver, was admitted into the hospital on the 16th March 1828. He had much œdema of the limbs and scrotum, some swelling, tension, and fluctuation in the abdomen, with tenderness in the epigastric region; also slight cough, and considerable difficulty of breathing in the horizontal posture. The pulse was 96, and small; the heat 96°; the skin dry; the tongue florid; the bowels slow; and the urine scanty. Towards the close of the previous December his complaints began with œdema after working some time in a damp place; and after disappearing for a short while, the swelling returned towards the end of January with rigors. He had a similar attack sixteen years before while in Spain, soon after being cured of ague. His pectoral complaints were also of some years standing.

The treatment consisted in frequent purgatives and supertartrate of potass as a diuretic. From this time till the 21st no particular change took place in the symptoms. The urine never exceeded twenty-four ounces. On the 21st it was ascertained to be coagulable both by heat and by muriatic acid. On the 30th the dropsical swellings had rather increased. He was attacked on that day with retching and vomiting, which recurred frequently. The pulse became more frequent. The thighs were excoriated, and an erythematous blush spread upwards on the nates. The œdema meanwhile continued to increase; great debility and exhaustion came on; and on the morning of the 4th May he expired.

Inspection.—The intestines were much distended and unusually white on their surface, and purulent matter was collected between their folds. Some pus was also found here and there on the liver, and in the region of the kidneys. Six pounds of sero-purulent matter were removed from the cavity of the abdomen. The mesentery and peritonæal covering of the lower turns of the intestines were unusually vascular at their depending portions. The peritonæal coat of the liver was checkered with purulent matter, which was also deposited between its lobes. Its substance was hard, and much tuberculated and knotty on the surface. It adhered firmly to all the adjacent organs, to the stomach, diaphragm, omentum, duodenum, descending colon, and particularly at its concave surface to a large firm tumour, which on subsequent examination was discovered to be the right kidney extensively diseased. This gland was converted into a large cyst having a thin crust of bony substance, and intersected internally by several partitions of the same nature; and its contents consisted of a turbid serous fluid with a large quantity of silvery flakes floating in it. These flakes I afterwards examined with care when washed; they were pure white and brilliant, like spermaceti; soluble in boiling alcohol, from which they crystallized on cooling; insoluble in a boiling solution of caustic potass; and fusible at a temperature somewhat higher than 212°. They were therefore pure Cholesterine. The right renal artery was nearly obliterated. The left kidney was much enlarged, and its internal structure softer and whiter than natural. The infundibula were here and there lined with specks of cholesterine. The ureter was larger than natural.

In the chest the lungs were found gorged in their posterior parts, and somewhat emphysematous on their anterior surface. The parietes of the heart were thickened, and the cavities of the ventricles contracted. In the sac of the pericardium and in each sac of the pleura a small quantity of serum was observed. The head was not examined.

Case VII.—The following case, which also occurred in the Clinical Wards during the Spring course of 1828, has been kindly communicated to me by my colleague Dr Alison.

Margaret Toulan, æt. 35, a married woman, was admitted into the hospital on the 22d February. The whole limbs were very œdematous, and the abdomen was considerably distended and fluctuating. She had headach, nausea, and dull heavy pain in the right hypochondrium, stretching across the stomach to the left hypochondrium, and increased by pressure or coughing. She had also frequent severe cough, with difficult, mucous expectoration, and some dyspnœa. The pulse was 100, small and irregular; the tongue rather dry; her sleep broken by frightful dreams; her appetite indifferent; the urine pale and scanty.

She reported that she had a similar attack nine years before; that it was caused by exposure to cold and wet; that it lasted three months; and was not preceded or accompanied by any local pain. Since then she had been for some years subject to cough, palpitation, and tendency to faint. The complaints for which she entered the Infirmary began a month before with shivering, which was succeeded by headach, nausea, pain in the abdomen, and increase of her pectoral complaints. In the course of a week the pain was principally felt in the hypochondrium; and she was seized with vomiting, which frequently recurred till about three days before her admission. The urine became scanty, and her legs œdematous only eight days before admission, and the œdema rapidly increased.

She was immediately bled to eight ounces, and a laxative powder was given; but she did not experience any relief. The blood was sizy. Next day she was ordered a calomel pill, and also a pill containing a grain of squill, with half a grain of digitalis, three times a-day, and twelve leeches were applied to the epigastrium with considerable relief to the pain. The same treatment was repeated on the three succeeding days, but with only temporary advantage, the urine continuing scanty, the dropsical swellings undiminished, and the tenderness of the abdomen unabated. On the last of these days, the 26th, she had much vomiting. Her medicines were discontinued, the common squill pill was substituted, and a grain of calomel, with as much opium, ordered to be taken thrice a-day.—On the evening of the 27th, as the vomiting was frequent, and the tenderness of the abdomen had increased, eight ounces of blood were again drawn from the arm, with some relief. The blood was buffy, and the serum opaline.—On the 28th and 29th the leeches were re-applied, and a draught of ether and laudanum given at times to check the vomiting. The urine was examined on the latter day, and found to coagulate abundantly when heated. For the next five days the vomiting and tenderness were less troublesome; but on the evening of the 4th March the tenderness of the abdomen had increased so much that she was again bled to eight ounces, and with much relief. The blood was buffy, and its crassamentum loose.

The vomiting, however, recurred; the urine continued scanty and very coagulable; no material impression was made on the dropsical swellings; the pulse became more rapid and feeble; and she was attacked on the 7th with a fit of rigors followed by pain in the right lumbar region. Afterwards the abdominal tenderness was felt most in the hypogastrium. Meanwhile her exhaustion rapidly increased; and she died early in the afternoon of the 9th.

Inspection.—The superficial cellular substance of the parietes of the abdomen was found generally thickened and softened, and presented several patches of increased vascularity and unnatural effusion of serum. Its substance had a grayish colour and pulpy consistence, quite different from the yellow colour and firm consistence of the healthy adipose substance covering the chest.

The peritonæum was healthy; the villous coat of the stomach and intestines was free from disease; the liver had a mottled appearance, but its substance was healthy. The right kidney was of a lighter colour, and more dense in its substance than natural. When it was laid open by a longitudinal incision, it was found of the same pale colour throughout; but the cortical substance had undergone most change. The left kidney was similarly affected. A slight effusion of serum was found in both cavities of the chest, as well as in the sac of the pericardium.

OBSERVATIONS.

In the following remarks on the cases now described, the reader may be presumed to be acquainted with the statements of Dr Bright, of which a full analysis appeared in a former volume of this Journal.* The substance of his observations is, that dropsy frequently arises from an organic disease of the kidneys, which when fully formed commonly consists in the deposition of a yellowish granular matter in its texture;—that this disorder is always found after death, when the urine during life is albuminous;—that in such cases the urine is of low specific gravity, and contains an unusually small proportion of urea and salts;—that the disease of the kidney is often indicated by pain in the loins or across the upper part of the belly, by sickness and vomiting, and occasionally by purple or bloody urine,—that it is very often accompanied in its course with a strong tendency to inflammation of the internal organs, and to affections of the head,—and that blood-letting is in most instances at some period of the disease an appropriate remedy. It will at once appear on a perusal of the cases related above, how pointedly they confirm all these statements.

The first, second, and seventh cases are examples of dropsy occurring along with disease of the kidney, and without disease in any of the other organs whose organic derangements of structure are usually considered the causes of dropsical effusion. The nature of the organic change which takes place has not been particularly settled, further than that the tubular part of the kidney becomes more and more encroached on by the yellowish deposite as the disease advances. The secretion of cholesterine by the kidneys in the sixth case is a curious fact, which may be turned to account afterwards when the pathological history of the disease is more fully ascertained. Meanwhile it appears to be connected as much with alteration of structure in the liver, as with disease in the kidney. Dr Bostock in some forms of tubercular liver found a substance approaching in nature to cholesterine diffused through the texture of that gland; and in the present instance the liver was in a very advanced stage of tubercular derangement.

In many of the cases related by Dr Bright, not only the kidneys, but likewise the liver, nay, sometimes even the heart also, were diseased. I have seen several examples of the former description; and very lately an instance of the latter kind occurred in the person of a woman *Wright*, a clinical patient, who was for a few days under my charge, She died evidently from diseased heart: But the urine was strongly coagulable. On dissection there was found much effusion of serum into the pericardium, the pleura, and the abdomen. The œdema was inconsiderable. The heart was much enlarged, and affected with hypertrophia; the aortic valves were retracted, and the curvature of the aorta dilated, and connected with an aneurismal sac. The liver was enlarged, and the yellow matter of its texture increased beyond the due proportion. The right kidney was partially invaded by the grayish-yellow deposite, the left kidney similarly, though very slightly, affected, and both were flabby and grayish-coloured externally. The urine coagulated copiously for at least a fortnight before her death. Here the heart was evidently the first organ which had suffered. In the case of Johnson (6), on the other hand, it is probable that the kidney was first disordered, and then the liver. These examples illustrate a remark of Dr Bright,—that there is a strong tendency of the organic diseases of the three organs, the heart, liver, and kidney, to succeed disease in one another, provided the patient live so long that the primary disease reaches an advanced stage.

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* Vol. xxx. 108.

In all the cases of dropsy with diseased kidney which have come under my notice the specific gravity of the urine has been much beneath the natural standard. The highest I have yet remarked is that of a woman *Dewar*, at present my patient, in whom it is 1021.3, while the daily quantity does not exceed sixteen ounces. The lowest I have examined was 1006.9. This observation was made in the instance of a woman *Burns*, lately under my charge, and at a time when the daily quantity was about the natural standard. It was so colourless as scarcely to exhibit a faint straw tint in a tumbler; and in a common ounce phial it appeared as limpid and colourless as water. It contained only 15 parts per thousand of solid matter, of which 11.6 were urea with the associated acetates. The specific gravity may be very low at an early period of the disease. In the clinical patient, *Wright*, (p. 282,) although the kidneys were very partially changed in structure, the density of the urine was only 1010.8, when the daily quantity was natural.

The fundamental change of the urinary secretion in this variety of dropsy is a diminution in the proportion and quantity of urea. In every case I have examined there was a material deficiency,—the quantity contained being seldom so much as half the usual proportion, and occasionally, as in the instance of *Burns*, not above a fifth. But, although probably an essential defect, as well as the chief cause of the dropsy and other symptoms, it does not appear that its relative scantiness is an accurate measure of the relative urgency of the disease in different cases. The woman *Burns*, in whom the urea is only a fifth of the natural quantity, has just been almost entirely freed from the dropsical swellings; and the man *Campbell* (case fourth), and the woman *Clinkscales* (case fifth), were cured, although the quantity of urea could not have been much greater. In *Wright* the urea did not exceed a third of the natural quantity; nevertheless the dissection proved that the disease in the kidneys had made very little progress. On the other hand, in *Irving* (case first), where the urea was a full half of the natural quantity, the dropsical effusion was removed very slowly, and returned very soon after its removal; and after death the kidneys were found in an advanced state of disease.—When by an increase of the secretion of urine the daily quantity of urea discharged approached or exceeded the natural standard, the dropsical effusion usually diminished with rapidity.

The salts of the urine are invariably diminished in quantity as well as the urea, and commonly in the same proportion. Yet in some instances, for example in the case of *Irving*, the quantity of salts in the urine does not observe at different times the same proportion to the urea. The insoluble earthy salts have appeared to me always very scanty, sometimes nearly wanting altogether.

In the three cases (1, 2, and 7) in which no other organ but the kidneys was diseased, Dr Bright's pathognomic sign, coagulability of the urine by heat, was remarked in a greater or less degree; and the same symptom was observed in all the other cases. I may farther add, that I have found coagulable urine in many other dropsical patients; and that in all in which the state of the internal organs was ascertained after death, amounting to eight or nine in addition to those here published, the kidneys were found diseased. This accords with the statement of Dr Bright that coagulable urine in dropsy will be invariably found to indicate organic disease in these organs.

Is the secretion of albumen vicarious of the secretion of urea? The affirmative would be a very natural supposition; but it does not accord well with all the facts. In most of the cases I have seen where the urine was very pale, of very low specific gravity, and deprived of the greater part of its urea, as in cases 2 and 3, as well as in that of *Burns*, the quantity of albumen was small, never exceeding $3\frac{1}{2}$ parts of dry albumen per thousand: While in the cases where the urea was considerable in quantity, as in that of *Irving* and *Dewar*, the albumen was also considerable, being in the former so high as 10 or 11 parts in the thousand. Besides, the secretion of albumen may be nearly or entirely prevented by proper treatment without the secretion of urea being restored; as is illustrated by the instances of *Campbell* (4) and *Irving* (1). Although the albuminous impregnation of the urine is not to be considered a substitute for the urea, it appears probable that the discharge of albumen by the urine, as well as into the great cavities and cellular tissue throughout the body, is caused by the retention of the urea and salts in the system. The greatest quantity of albumen I have found in any of the cases which have come under my notice, was 14 parts per thousand. This was in a woman *Carmichael*, now my patient. The whole solid contents of the urine amounted to 36.25 per thousand, the daily quantity of urine being at the time natural. In Dr Bright's cases the albumen appears to have been often much more abundant.

An interesting fact observed by Dr Bostock in his experiments on the coagulable urine of Dr Bright's cases is, that the serum of the blood has sometimes a low specific gravity, and is deficient in its proper proportion of albumen. This is exemplified by the case of *Irving* (1), in whom the density of the serum was only 1020, and the solid contents 68 parts in the thousand; by the case of *Carmichael*, mentioned above, in whom the specific gravity of the serum was 1022.5; and also by the case of *Thomson*, (3), where the density of the serum was 1024.8, and the solid contents 81 per thousand. Healthy serum, it is well known, exceeds even the last of these considerably in density and in the quantity of its solid matter: The serum of blood taken from a girl who was feigning sickness, I found to have a specific gravity of 1030.8, and to contain 102 parts of solid matter per thousand. The specific gravity of the serum has always been lowest where the urine was most loaded with albumen. It is hence probable that the albuminous secretion of the urine is nothing more than a transudation of serum from the blood.

Another interesting object of research in this disease relates to the presence of urea in the blood. Dr Bostock sought for it in the serosity of several of Dr Bright's patients, but could detect only " a matter possessing peculiar properties, which seemed to approach to those of urea." In the case of *Magee* (2), I detected unequivocally a considerable quantity of it in the blood after death. The crystals ultimately formed by nitric acid were brilliant scales of a grayish-red colour, in every respect the same as nitrate of urea formed in extract of urine. In the case of *Thomson* (3), an attempt was made to discover it in the serum of blood drawn during life. Crystals were formed in the alcoholic extract by nitric acid; but they were acicular, and had not the scaly appearance of true nitrate of urea. They had a brilliant, pearly appearance, however, and resembled that salt in every other respect except in their form of crystallization. I have since had an opportunity of examining the serum of a patient where the circumstances were very favourable to success. This was in the case of the woman *Burns*, mentioned in page 283, whose urine, although not greater in quantity than natural, contained only a fifth of the usual proportion of urea. She was cupped in the loins on account of pain in that quarter. The serum was examined in the manner described in page 274; that is, an extract was made from the serosity, and an alcoholic extract was prepared from the aqueous extract,—all the evaporations being conducted in the vapour bath. This extract was crystalline and deliquescent. Its solution in water was treated with nitric acid; upon which a slight effervescence took place, an odour was discharged like that of the action of nitric acid on extract of urine, and in two or three minutes the whole fluid was apparently converted on a sudden into a beautiful radiated mass of foliaceous pearly crystals. These when dried on blotting-paper did not differ in any respect from scales of common nitrate of urea. The quantity was by no means inconsiderable. It may be regarded as proved, therefore, that in the dropsy arising from diseased kidney, urea exists in considerable quantity in the blood when it is materially defective in the urine.

The preceding results confirm the conclusion drawn not long ago by MM. Prévost and Dumas from their ingenious experiments on the extirpation of the kidneys in animals,—that urea is not generated in the kidneys, but exists ready-formed in the blood, and is merely eliminated by these organs.

It is necessary to add, that I have made three other attempts to discover urea in the blood, without success. But this was in cases where the proportion of that principle in the urine was about twice as great as in the three instances in which I was successful, and where consequently a much less proportion existed in the blood. Although crystals were not formed in the alcoholic extract by nitric acid, a granular matter was sometimes thrown down, and an odour was always exhaled like that given out during the action of nitric acid on extract of urine.

A very common appearance of the serum of the blood in the present disease is a slight milkiness amounting to opalescence. This state I conceive to depend on the presence of a little oil in the blood. Dr Bostock indeed was unable to detect any oleaginous matter in such blood. But perhaps his failure may have been owing to the method of analysis, which he has not detailed. I have several times detected oil in opaline serum, by agitating it in a tube with ether, allowing the mixture to remain at rest a few seconds and withdrawing and evaporating the etherial fluid which rises to the top. This method answers very well, as ether, provided it be free of alcohol, does not coagulate the albumen of serum. Care must be taken to use ether free of fatty or waxy matter, which it very generally contains.

As to the symptoms of this disease in the kidneys, the observations made in our Infirmary fully coincide with those of Dr Bright.

Of the symptoms which may be considered proper to the diseased state of the kidney, there have often been remarked pain and tenderness in the loins, still more frequently dull pain and tenderness across the upper part of the belly, sickness and vomiting, occasionally dysuria, or frequent micturition, and sometimes red urine. The abdominal pain has sometimes been confined to the right hypochondrium; and that when the liver was not at all affected. These symptoms have at times been distinctly traced as having occurred before the dropsical effusion appeared; and sometimes they were preceded by rigors. Wherever the exact commencement of the dropsy could be recollected by the patient, the disease was described as having occurred soon after some unusual exposure to cold; and several have ascribed it to having drunk excessively of cold water while overheated. The dropsical effusion, which is to be considered not so much a disease, as one of the symptoms of a disease, is not an essential, though a very general, accompaniment of the deranged state of the kidneys. The patient *Magee* (2) was for a few days entirely free of œdema and ascites, and they returned only in a very trifling degree a short time before his death. *Irving* was at one time free of dropsical effusion for several weeks after the urine had ceased to be abundant; yet there could be no doubt that the kidneys were at that time extensively disorganized.

Dr Bright has called the attention of the profession pointedly to a strong tendency which prevails in this disease to inflammatory affections of the great cavities. This tendency has not been remarked so much among the patients of the Edinburgh Infirmary. Inflammation of the chest in particular has been by no means so frequently remarked with us as among his patients in London. Chronic catarrh, connected for the most part with pulmonary emphysema, has been almost an invariable accompaniment; but peripneumony or pleurisy has been seldom witnessed. On the other hand, we have remarked a strong tendency to affections of the head. In one instance bloody tumours were formed in the lateral ventricles (case 1;) in two the patients died with gradually increasing coma (2 and 3) and in a fourth, the somnolency was so great as to excite fears of an incipient disease of the brain (4.) The tendency to excessive somnolency has also been remarked in other instances, which have not been detailed in the present paper. In reference to this affection, the appearances after death in *Magee*, who died with it very distinctly marked, are interesting. Instead of congestion or other appearance of determination of blood to the brain, that organ and its membranes were most unusually free of blood.

The treatment laid down by Dr Bright has been long applied in Edinburgh as well as elsewhere to cases of what were usually called inflammatory dropsy,* and which there is much reason to believe were frequently dependent on incipient derangement of structure in the kidney. Since his work was published, the same treatment has been employed with juster views of its mode of operation; and with marked success. The good effects of blood-letting are distinctly shown in several of the cases here published, but above all in those of *Campbell*, *Irving*, and *Clinkscales*, (4, 1, 5); and the particulars of Campbell's case will show that in a proper subject the abstraction of blood may with propriety be carried to a very great extent. This remedy has never seemed to act so beneficially on the dropsical swellings, abdominal pain, and collateral affections, as when the albuminous impregnation of the urine diminished or ceased soon after the blood was drawn. The blood has often been buffed and cupped to an extent hardly ever surpassed, even in acute rheumatism; and in such cases blood-letting has appeared to me more effectual than where the blood coagulated in the usual manner.

Various diuretics have been tried. Digitalis has acted well in many instances; in others, if the symptoms had not begun rather too early for such a supposition, it might have been conceived that digitalis acted dangerously as a narcotic. Supertartrate of potass has appeared here as in Guy's Hospital to be one of the most certain of the diuretics which have been resorted to. Mercury, which Dr Bright seems to dread as being likely to excite severe ptyalism, or even gangrene, although used in moderate doses, has been resorted to on many occasions to aid the operation of diuretics; and even when it did affect the mouth, which, however, was never intended, its effects appeared as manageable as in other diseases.

The main purpose served by diuretics is to increase the daily quantity of the urea and other salts usually thrown off by the urine. In this respect the action of diuretics deserves particular notice. It is not merely the quantity of aqueous secretion that is increased by their means. The solid contents are generally increased in nearly an equal proportion, that is, while the daily quantity of urine is increased, the urine retains its specific gravity, or at least does not lose it nearly in the proportion in which its quantity is augmented. Thus, in the case of *Irving*, on the 22d September, when the quantity of urine exceeded 90 ounces, the density was 1016.4, and the solid contents 36.9 per thousand; while, on the 16th October, when the quantity was 36 ounces, the density was 1016.3, and the solid contents 39.3. In the patient *Burns*, whose case has been several times alluded to, though not detailed, the urine on the 31st July was 30 ounces daily, and had a density of 1006.9, with 15 parts of solid matter per thousand; while, on the 3d of August, by which time she was under the influence of supertartrate of potass, so that the daily quantity amounted to 84 ounces, the density was 1006.4, and the solid contents about 14. This fact renders the beneficial operation of diuretics very intelligible: They enable the kidneys to throw off the quantity of salts and hyper-azotized matter, which is daily discharged in the healthy state, whose discharge is essential to the preservation of health, and the deficiency of which in the urine is doubtless the cause of the dropsy and other affections observed in the disease under consideration. It is a singular fact, that the œdema often gains ground when the urinary secretion is rather above than under the natural standard as to quantity. Nay, in some cases the œdema gains ground though the quantity of urine is much above the healthy average. The case of Irving about the end of September, (p. 265,) is a striking illustration; and I have since met with other examples of the kind hardly less remarkable.

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* Dr Abercrombie, Edin. Med. and Surg. Journ. xiv.; Dr Tweedie, ibid. xv.; Dr Graham, ibid. xviii.

An important point in respect to the treatment of this variety of dropsy, and of the disease on which it depends, is the possibility of a radical cure. Of this Dr Bright seems disposed to entertain doubts (p. 70.)

When the change in the structure of the kidneys has arrived at an advanced stage, a cure is evidently impracticable; for the secreting apparatus is actually destroyed. This stage is probably indicated by an excessive deficiency of urea in the urine, whether it be highly albuminous or not. At the same time it is worthy of notice, that when the urine is in this state, very marked amendment has been accomplished, if not absolutely a cure. In the case of *Campbell* the urine, from its pale colour, low specific gravity, and the quantity of albumen contained in it, certainly did not hold more than 24 parts per thousand of urea with the associated acetates; nevertheless, after having been some weeks in a state of great debility, with much œdema and alarming symptoms of the head affection, which has usually terminated the disease in our Infirmary, his œdema entirely disappeared, his ruddy complexion returned, and his strength and activity, both of body and mind, were restored nearly to their original condition. But it was remarkable that the urine was still deficient in urea, while it had altogether lost its impregnation of albumen. It was the source of great regret that this man's progress could not be watched longer. For the urine at the time of his dismissal, although not diminished in quantity, was decidedly deeper in colour than a few weeks before ; and it appeared not at all improbable that the urea was in the course of being restored still farther, perhaps even to the natural standard. At all events, however, this case will go far to establish, that the change going on in the kidneys may be arrested at a stage which is compatible with the enjoyment of good health under careful regimen. The case of *Clinkscales*, treated by Dr Gregory, is a farther proof of this; nay it seems even to show that the secretion of urea may be very much restored, after being in great measure suspended. To what extent it was actually restored it is impossible to say, as the colour of the urine in this variety of dropsy is sometimes tolerably deep, when the proportion of urea is considerably short of the healthy standard, and a press of other occupations prevented me from making in the case of Clinkscales the analysis which was entrusted to me. I have just learned that this woman died at the end of July with the same complaints of which she was cured in April. This will show the exceeding tendency of the disease to return. But, nevertheless, I cannot help thinking from her appearance and the state of the urine at the time of her dismissal, that a complete cure was accomplished, and that with ordinary care on her part, and proper medical superintendence, the cure would have been confirmed.

A powerful argument in favour of the possibility of accomplishing a radical cure in such cases is the well known fact, that the dropsy which sometimes follows scarlet fever is often cured completely. This variety of dropsy has not yet been examined in reference to the views advanced by Dr Bright. But the urine during its course is often coagulable. Dr Abercrombie indeed mentions in the history of one of his cases in his paper on the treatment of dropsy by blood-letting, * that it was not coagulable. My colleague, Dr Alison, however, informs me, that he has found it not only often coagulable, but likewise occasionally red or even almost black, as if loaded with the colouring matter of the blood,—a state which Dr Bright says is not uncommon in dropsy with coagulable urine unconnected with scarlatina. There appears little reason to doubt, therefore, that in the dropsy consequent on scarlatina the kidneys are often diseased ; and probably this disease is the cause of the dropsical effusion. Such cases being familiarly known to admit of a radical cure, it may be inferred that the dropsy which is the special subject of this paper is similarly circumstanced.

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* Edin. Med. and Surg. Journal, xiv. 172.

Many cases of the successful treatment of dropsy with coagulable urine will doubtless occur to the recollection of practitioners of extensive experience. But it may be reasonably objected to cases quoted from general recollection, that their ultimate history was not ascertained, and that the statements of Dr Bright, as well as the cases detailed in the present paper, show a marked tendency in the disease to return after a brief, though sensible interval. My colleague, Dr Alison, however, has stated to me that he is certain he has known cases of permanent cure effected in adults who had dropsy with coagulable urine, unconnected with scarlatina, but who were subjected to early treatment; and he has mentioned a special case, where, after a severe attack, the patient remained free of dropsy for seven years. She is now, however, labouring under a second attack of the disease.

In relation to the present topic, a very material object is to ascertain more precisely the symptoms at the commencement of the disease in the kidneys; for there seems a probability, that in its commencement it is a low inflammatory affection, which may be vigorously and effectively treated. These symptoms have not been very well ascertained, and what is equally unfortunate, they are often so trifling as to receive little notice from the patient. It is not improbable that an albuminous impregnation of the urine occurs very early. Although this condition, according to the statements of Dr Bostock, * occurs occasionally in the healthy state of the body, it is a phenomenon which ought always to excite suspicion, and enforce the necessity of farther inquiry.

August 4, 1829.

Art. V.—*Remarks on Amaurosis, with Cases.* By Dr J. A. Robertson, F. R. S. E. Surgeon to the Eye Dispensary of Edinburgh, &c.

The term Amaurosis has never been distinctly defined, but may be considered as applicable to all those cases in which vision is impaired or lost from functional or structural disease of the retina or optic nerves.

A preternatural state of dilatation of the pupil, the iris remaining immoveable under every change of light, has been considered a very certain sign of amaurosis; but I have seen in more than one instance the pupil dilated and immoveable, without vision being much affected. Two years ago I attended a patient labouring under slight attack of iritis. When he first came under my care the pupil was exceedingly small. Belladonna was employed during the whole course of the disease. It kept the pupil constantly dilated, and it remained so ever afterwards, giving the eye an amaurotic appearance. It is probable that in this case the permanently contracted state of the iris arose from lymph being effused, and joining together the different fibres of the iris at the period that this membrane was inflamed, and at the same time kept contracted by the belladonna. We frequently also see a dilated pupil with the iris hanging like a loose curtain, making undulating motions each time the eye is moved, without any amaurotic affection being present. Instead of a dilated pupil, amaurosis is frequently accompanied with a fixed, immoveable, and contracted pupil. The instances in which I have seen this variety have been those in which the patient had previously suffered from iritis. The papillar margin of the iris was irregular from adhesions formed between the iris and capsule of the lens, or from an agglutination of its component fibres by the effusion of lymph. I have also met with cases of amaurosis in which the iris contracted and dilated as freely as in a healthy eye. I was lately consulted by a young lady who was completely blind of the right eye, and so sensible were the irides to light, that I could not tell by the minutest examination which eye was diseased. Hence it is evident that no positive conclusion can be drawn with regard to the nature of the disease from the state of the iris exclusively considered, although it assists us in forming our diagnosis. Richter asserts that a degree of squinting is the only unfailing diagnostic mark of amaurosis. This symptom, however, is by no means invariably present.

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* Bright's Reports, p. 8.

This disease occurs at all ages; the middle period of life appears to be most subject to its attacks, and dark coloured eyes are more frequently affected than those of a light colour. Amaurosis is more distinctly hereditary than even cataract. Some families for generations have become blind from amaurosis, and generally about the same period of life. I have seen this disease hereditary in two or three instances. In one, a grandmother, and four of her grandchildren, were affected with amaurosis, and in all of them the complaint appeared about the age of puberty. In persons so predisposed the slightest exciting cause may bring on the disease, as the suppression of any habitual discharge, indulgence in spirituous liquors, emotions of the mind, and especially any thing that causes a determination of blood to the head.

To show how much the retina is affected by the state of the circulation, I may mention a case related by Richter of a man of a plethoric habit, who, when he held his breath and looked at a white wall, saw a kind of net-work, which alternately appeared and disappeared with the diastole and systole of the heart. I have seen three instances in which the patient could distinctly count the pulse in the same manner, but without holding the breath. These were all cases of iritis of some standing, in which probably the choroid, and perhaps the retina, were also affected.

There cannot be a doubt that amaurosis is in many instances brought on by pressure on the nerves which supply the eye, occasioned by the state of the blood-vessels in their immediate neighbourhood. Pressure never fails to lessen or destroy nervous energy. When applied with force or long continued, it destroys the texture and powers of a nerve; when the application is for a short time and not violent, the function is merely suspended, and returns on the removal of the cause.* Many cases of amaurosis are on record, which appear to have arisen from pressure caused by cerebral plethora. Beer relates the case of a Jewess, who in her first three pregnancies became quite amaurotic by the third or fourth month. After her first accouchement she recovered her sight; after the third vision never returned. Schmucher states, that he visited a strong young woman, who became amaurotic ten days before delivery, but recovered her sight after the birth of the child, and that he has seen three similar cases. Portal gives us the history of a patient who became blind after the birth of her first child,—after that of the second she became deaf,—and after the third she nearly lost the faculty of speech. During her next pregnancy, by having recourse to bleeding, which had not been previously adopted, she not only escaped a repetition of the amaurotic affection, but the effects of the former attacks were much relieved.—About three years ago I attended a tinsmith in this city, who suddenly lost the sight of his right eye; about two months afterwards that of his left. Six weeks after his being completely deprived of sight, he had an apoplectic attack during the night, on recovering from which, he had lost his hearing, his speech gradually failed, and he lived about two months deprived of sight, hearing, and speech. He gradually became comatose, and died about six months from the commencement of his complaints.

The following cases will illustrate many of the remarks I have just made, and show the effect of blood-letting in the cure of those cases of amaurosis which appear to depend on pressure on the nerves of vision, caused by the state of the circulation.

Case I.—Jane Mackenzie, of a robust habit, had enjoyed good health. Was engaged in washing, and supposes that she caught cold, which caused the suppression of the menstrual discharge, which had commenced the previous evening. She complained of slight headach on going to bed, slept well, but on awaking found herself totally blind of both eyes. I saw her at eleven o'clock of the same day. The pupils were much dilated; conjunctiva slightly injected; pulse 80, with a full beat; tongue clean; skin rather hot and dry; complained of a feeling of weight in the head and total blindness, being unable to distinguish light from darkness. I immediately opened a vein. When she had lost about ℥xxiv. she said that she thought she could see a little light; when ℥x. more had been taken, she suddenly fainted. On recovering, her sight was so far improved that she could distinguish the bars of the windows. A blister was applied to the nape of the neck, and a smart laxative powder taken. At four o'clock the sight was much the same as after the bleeding. Pulse 100, beat small and weak. Medicine had not operated. A cathartic injection was ordered; and after its operation, twelve leeches to be applied to the labia pudendi; the bleeding to be encouraged by means of the hip-bath. She fainted from the profuse bleeding from the leech-bites, and copious operation of the laxative powder and injection. She remained about an hour in a state approaching to insensibility, and gradually recovered, and to her great delight, found her sight so much improved, that she could distinguish every one round her; but they appeared to her as seen through a mist. On calling the following day, I found her sitting up in bed reading a large family Bible. The menses did not return till the following period. The blister was kept open for some weeks, and the bowels regulated by means of laxatives. No return of amaurotic symptoms took place. It may perhaps appear to some practitioners that the treatment pursued was rather too active; but I had previously seen cases of amaurosis, which, from the history of the cases, convinced me, that, had active depleting measures been resorted to at an early period of the disease, the sight might have been restored. The following case will afford an example.

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* See excellent observations on this subject in treatise upon Amaurosis, by Mr Stevenson.

Case II.—John Lough, aged 28, a sailor on board one of the steam-packets, and occasionally employed as a chimney-sweeper, complains of total blindness of the right eye, and can scarcely distinguish night from day with the left. States, that on awaking one morning about six weeks ago, while on board the steam-boat, he found himself deprived of vision in the right eye, for which he could assign no cause, having been in perfect health, and having for some time previously led a temperate life. About a week ago, after being engaged in sweeping a chimney, while in the act of smoking a pipe, he became suddenly giddy. On recovering, he found the sight of the left eye almost gone, being with difficulty able to distinguish light from darkness. About a fortnight after the right eye was affected, and he was bled to syncope without deriving any advantage from it. Some time afterwards leeches were applied to the forehead, which afforded him temporary relief. From that time to the present no treatment has been followed. The pupils of both eyes are much dilated. My friend Dr Farquharson bled this patient to syncope. A blister was applied to the nape of the neck ; and after the operation of a laxative powder, two mercurial pills were directed to be taken night and morning. On the following day, he stated that the sight of the left eye was considerably improved. The iris contracted slightly on the admission of light ; and he could distinguish the form of any object placed betwixt him and the light. The blister was repeated, as the first one had not acted ; and the mercurial pills ordered to be continued. From this time his sight gradually improved ; and at the expiration of ten days he resumed his former occupations, the sight of the left eye being as good as ever it had been. The right eye, to use his own expression, continued " stone blind." It appears to me highly probable, that, had the same treatment which proved so beneficial to the left eye been adopted shortly after the right one became affected, the result would have been very different.

Case III.—John Williamson, aged 40, formerly in the army, afterwards a gentleman's servant, complains of total loss of sight in the right eye, and vision much impaired in the left. States, that ten days ago, on the King's birth-day, he drank rather too freely to his Majesty's health ; was, in short, so drunk, that he was carried home in a state of insensibility. Next morning he suffered much from headach and great dimness of sight, especially of the right eye. The headach has never left him, and his sight has been daily getting worse. The pupils of both eyes much dilated ; the iris of the right eye almost immoveable ; the eyes have a dull watery suffused appearance ; countenance inanimate ; bowels regular ; skin natural ; tongue of a chalky white colour ; pulse 60, with a full heavy beat. He was bled to ℥xxvi., when he fainted. A brisk cathartic was administered. In the evening he felt considerably lighter ; headach much relieved ; thought that he could see more distinctly. A blister was applied to the nape of the neck ; and, as the laxative powder had not operated, it was repeated. The following day he could make out the large letters of a title-page with the left eye. The sight of the right a little improved, and the iris more sensible. The blister was kept discharging. Two mercurial pills were ordered to be taken night and morning, and a dozen of leeches were applied three separate times in the course of the week to the temple. He did not appear to derive any particular advantage from the leeches. The left eye daily improved; but the right was not materially benefited until the mercury affected his mouth, which occurred on the eighth day from the commencement of the medicine. At the expiration of another fornight he stated that he thought his sight as good as ever it had been.

Case IV.—Janet Dobson, aged 30, of full habit, complains of almost total blindness, being scarcely able to point to a lighted candle placed before her. States that she had formerly been a house-servant; was seduced by the butler; and forced to leave her place about a year and a-half ago, in consequence of being with child; was delivered of a dead child at the full period; became nearly blind during labour, but recovered her sight an hour or two after delivery. For the last year has led a dissolute life. Has ever since the birth of her child been subject to occasional blindness, which sometimes lasted three or four hours, and was invariably accompanied by a feeling of weight in the head. These attacks generally occurred during the night, and after she had been drinking or making any unusual exertion. The worst attack came on while dancing a reel. She remained completely blind for four or five hours; then fell asleep, and awoke in the morning nearly quite well. During all her attacks her other senses remained entire. The only thing that afforded her relief was the application of a wet towel to the head, which had the effect not only of lessening the headach, but of improving her sight. The only other remedy she had used was a wash for the eyes, which had done them no good. When she applied to me, I found the irides quite insensible to the stimulus of light, and the pupils much dilated. The conjunctiva of its natural appearance; tongue loaded; pulse 96, rather full; the bowels generally constipated. This patient was bled in the erect position to ℥xvi., when she fainted. The bowels were freely evacuated, and a blister applied to the nape of the neck. From these means she derived but little benefit. She was then put under the influence of mercury. As soon as her mouth became affected, her sight began to improve; and at the end of three weeks she could see well enough to direct herself through the streets. On calling one morning, I found that she had left her lodgings secretly the night before to escape paying her rent. Since then I have heard nothing of her.

It is only in cases of recent occurrence, attended with symptoms of congestion, that I have found blood-letting to be of such manifest and immediate service. The effect of this remedy was always much greater when fainting was produced than even when a larger quantity of blood was drawn without that effect; the suspension of action and collapse of the vessels induced by the syncope sometimes removing altogether the disease. Even when the disease was of some standing, in those cases in which it appeared to arise originally from congestion, blood-letting was highly useful, although not to the same extent as in cases of recent date; and it appeared to me that mercury, which is so frequently useful in amaurotic affections, acted more beneficially after bleeding than when given without its being premised.

58, *Queen Street, 20th July* 1829.

(*To be continued.*)

Art. VI.—*On the Sounds produced by the Action of the Heart.* By David Williams, M. D., Physician to the North Dispensary, Liverpool.

In exploring the action of the heart in the healthy state by means of the stethoscope, we find its movements to be performed in a determinate order. We hear first a dull, prolonged sound; this is instantly followed by a sharp, quick sound; then comes a moment of repose. All who are acquainted with auscultation, must know that M. Laennec attributed the first of the two immediately successive sounds, after the interval of repose, to the systole of the ventricles, and the second to the contraction of the auricles; likewise that he considered the interval of silence after the second sound, as a pause between the termination of the contraction of the auricles, and the commencement of the systole of the ventricles. Lately, the accuracy of this explanation has been questioned. I allude more particularly to observations on the causes of the sounds produced by the action of the heart by Mr Turner, in Vol. iii. of the Transactions of the Medico-Chirurgical Society of Edinburgh. As this paper contains Laennec's own account of the sensations communicated by the action of the heart through the medium of the stethoscope, and also the general opinion of physiologists, on the relation which exists between the contraction of the auricle and the systole of the ventricle, I shall take the liberty of extracting the following information from this source.

" M. Laennec," says Mr Turner, " in describing the rhythm of the pulsations of the heart in its natural condition, as ascertained by the stethoscope, states,—' At the moment the artery strikes the finger, the ear is slightly raised by a motion of the heart synchronous with that of the artery, and accompanied by a sound somewhat dull, but distinct. The synchronism does not permit us to doubt that the phenomenon is owing to the contraction of the ventricles. *Immediately after, and without any interval*, a sound more sharp, and analogous to that of a valve which is raised, the crack of a whip, or the lapping of a dog, announces the contraction of the auricles." He adds, "no motion sensible to the ear accompanies this sound; *no interval* separates it from the duller noise accompanied by the raising of the ear, that indicates the contraction of the ventricles, which it seems to limit and to interrupt suddenly."—"Immediately after the systole of the auricles, there is an interval of repose, very short, but well marked; after which the ventricles are again perceived to raise themselves with the dull sound and gradual progression which are peculiar to them; the sudden and more sonorous contraction of the auricles follows, and the heart again falls for an instant into an absolute immobility."

In reference to this description, Mr Turner remarks, "Although there can be no doubt that the sensations communicated by the actions of the heart are most accurately described by M. Laennec, yet I suspect that the explanation he has given of these sensations is incorrect. That the first of the two consecutive sounds or sensations of motion is connected with the contraction of the ventricle is obvious, from its being synchronous with the pulse in the arteries, and also from the apex of the heart being felt during it to strike against the ribs. But that the second of the sensations is communicated by the contraction of the auricles, I conceive not to be proved by any thing which has been observed, and to be inconsistent with the nature of the action of the heart, as ascertained by physiologists from the inspection of that organ in living animals."—"According to the description I have quoted from Laennec, the contraction of the ventricles is made the first of the two consecutive motions; the contraction of the auricles is supposed to follow it instantly without any interval; and the quiescence or diastole to take place on the termination of the contraction of the auricles. On the contrary, according to the observations of preceding physiologists, the contraction of the auricle is the first of the two consecutive contractions; that of the ventricle follows it immediately; and the diastole of the heart takes place between the termination of the contraction of the ventricles and the commencement of that of the auricles."

In confirmation of this Mr Turner refers to the description given of the action of the heart by various physiologists. Among others he quotes Harvey, who states, "There are as if two motions at the same time,—one of the auricles, the other of the ventricles themselves; nor are these performed altogether simultaneously; but the motion of the auricles occurs first, and that of the *heart* follows; and the motion is seen to begin with the auricles, and to proceed to the ventricles." Lancisi supposed the contraction of the auricles and the systole of the ventricles to be synchronous with each other. On which Mr Turner remarks, that, "Whether the opinion of Lancisi be true or not, his observations confirm in a remarkable manner the fact, that the contraction of the auricles immediately precedes the contraction of the ventricles, and that the succession of these motions is so instantaneous, that it is difficult to distinguish them from each other." This fact Mr Turner considers to be established, and from it he concludes,—"That, in applying the ear or the hand to the thorax, the contraction of the auricles of the heart either is not evident to the senses, or is perceived continuous with the contraction of the ventricles, and that the two contractions communicate only one sensation." Mr Turner further observes, "It remains to be determined, on what depends the second of the sounds and succussions which take place immediately after the contraction of the ventricles." His propositions may be divided into two, 1*st*, "Whether it can be accounted for by the impulse occasioned by the falling back on the pericardium of the relaxed heart in its diastole, after it has been elevated or moved from its place in the systole?" 2*d*, Whether the expansion of the ventricles immediately after their systole may not contribute in addition to the falling back of the heart?"

With respect to the first proposition, I think few persons who have explored the heart with the stethoscope in cases of lesion of its valves can be perfectly satisfied with it. If we admit the second of the two consecutive sounds to be altered from its healthy state in cases of lesion of the auriculo-ventricular valves, must not this alteration of sound be somehow dependent on that lesion? If so, then it may be asked, how can it be supposed that a sound produced by the falling back of the heart on the pericardium can be modified by a morbid lesion of the auriculo-ventricular valves? The second of the two propositions is partly founded on the hypothesis, that the ventricles of the heart expand themselves after each systole in the same manner "as a bag of caoutchouc or strong leather expands after having been compressed." As to this hypothesis, I cannot admit it, for reasons I have elsewhere stated,* but consider it to be directly opposed to the phenomena which we observe on viewing the action of the heart, and also to the properties of its structure.

From the foregoing remarks adduced by Mr Turner, it appears to me to be quite evident, that the sound mentioned by

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* See Edin. Med. and Surg. Journal, April 1824.

Laennec as analogous to that of a valve which is raised, the crack of a whip, or the lapping of a dog, cannot be caused by the contraction of the auricles as he supposed. Although I agree on this point with Mr Turner, yet I cannot say that I am satisfied with either of the ingenious conjectures which he has offered in elucidation. We shall therefore inquire whether any other cause offers a more satisfactory explanation of the phenomenon in question. I may here, however, premise, 1*st*, That I consider the sensations communicated by the action of the heart to be most accurately described by M. Laennec. 2*dly*, That I conceive the first of the two consecutive sounds to be principally occasioned by the passage of the blood into the arteries during the systole of the ventricles. 3*dly*, That I concur in the general opinion of physiologists, that the contraction of the auricles immediately precedes the systole of the ventricles; consequently, that the interval of repose is after the systole of the ventricles, and that the last of the two consecutive sounds accompanying the action of the heart arises from some other cause than the contraction of the auricles, as was supposed by M. Laennec. 4*thly*, That I imagine the sound occasioned by the contraction of the auricles to be blended with the systole of the ventricles. 5*thly*, That I consider the second of the two consecutive sounds to be caused by the action of the valves, and, for reasons which I shall presently assign, to be mainly occasioned by the action of those of the auricular orifices.

As the cause which I imagine to produce the sound in question appears to warrant a somewhat different explanation of the action of the heart to what has hitherto been suggested by any physiologists whose writings I have perused, I shall make a few observations on the internal appearance and structure of the cavities of this viscus, so as to enable me to explain the ideas which I entertain on the subject more clearly. In examining the interior of the cavities of the right side of the heart, we cannot but be struck with the difference observable between the smooth and uniform surface of the sinus venosus and the reticulated appearance of the auricula. When we contemplate this very marked difference with reference to its purpose in the economy, we must conclude the fleshy fasciculi of the auricula to be calculated for much greater latitude of action than the slightly muscular and even parietes of the sinus venosus. In confirmation of this, if we can rely on the testimony of the eye and touch, we find the contraction of the auricula to be sudden and decidedly distinct from that of the sinus venosus, and also to be much more obvious. To the eye every muscular fibre of the auricula when it contracts is apparently thrown into the greatest degree of action, and appears as if it were contracted to the utmost; to the fingers it also feels as if the opposite sides were brought completely into contact. On the contrary, the action of the sinus venosus seems to the eye to be extremely limited, to be apparently a continual movement; and the touch detects no sudden and active contractions like those of the auricula, nor any thing like an approach to contact of its opposite sides. From this, then, it appears that the auricle (I mean the cavity as including the sinus venosus and auricula,) when the auricula contracts does not empty itself completely of the blood which it contains; and further, that only the auricula can be said to contract actively. A somewhat distant resemblance is observable between the internal surface of the ventricle and that of the auricle. In the ventricle we have a smooth and also a reticulated surface. The smooth and equal channel, which leads towards the arterial orifice, may be compared to the uniform surface of the sinus venosus, and again, the columnæ carneæ to the musculi pectinati. As the auricle most probably propels only a part of the blood which it contains into the ventricle at each contraction of the auricula, it is not unreasonable to suppose that the ventricle likewise propels only a portion of its blood into the artery at each systole. Since then a quantity of blood is probably left after each systole, we may I think infer from the uniformity of the surface of the channel leading towards the arterial orifice, that this channel is the principal lodgement of the unexpelled blood.

The valves of the auricular and arterial orifices of the heart, although they exercise similar offices, yet in their mechanism differ materially; and if we may judge from the properties of their respective structures, we may, I think, infer the immediate power by which they exercise their offices to be partially of a very different nature. The semilunar valves are simple membranous folds, and consequently exercise their offices independently of any contractile property inherent in themselves;—they are closed and opened by the direct impulse of the alternate currents of the blood. Their action may therefore be considered to be as purely a mechanical one as any in the body. The auriculo-ventricular valves are likewise membranous folds, but they have inserted along their fringed edges the tendons of the musculi papillares. As the latter form a part of the valvular apparatus, and have inherent in themselves the principle of motive power, the valves of the auricular orifices must necessarily exercise their office in a different manner from those of the arterial orifices. The contractile property inherent in the structure of the auricular valves has I think engaged but little of the attention of physiologists, since their action seems to be regarded as equally mechanical as that of the semilunar valves. The musculi papillares appear to be considered as processes having little or no action,—as in fact nothing more than a stay to prevent the valve when shut from being pushed into the auricle, for the valve is assumed to be opened by the impulse of the blood in its passage from the auricle into the ventricle. Mr John Bell, in explaining the manner in which he supposes the function of the auricular valves to be exercised, states, that "the valves fall down easily when the blood goes down through them, and they rise readily and quickly whenever the blood gets behind them." And he adds, "the auricle by its action lays down the tricuspid or auricular valve and fills the ventricle." * In these extracts it is evidently implied that the auricular valves are both opened and closed solely by the impulse of the blood. That the auricular valve is closed solely by the impulse of the blood cannot be doubted; but, with every deference, I certainly must differ in opinion with respect to the power which opens it. As we cannot observe the manner in which the auriculo-ventricular valves perform the valvular office, I must beg particular attention to the state we find them in; to the appearance of the musculi papillares; and to their probable condition at the moment when the systole of the heart is terminating. In examining the inner surface of the ventricular cavity we see the valve descending contiguous to the sides of the ventricle, and we find the chordæ tendineæ to be dense to the touch. The musculi papillares we observe to be distinct muscular columns, of different sizes, and extremely compact in their structure. From the tense state of the tendinous chords, and the total want of any other mechanism to prevent the valves from being pushed into the auricle, it is pretty evident that the valve cannot close the orifice and resist the force of the systole of the ventricle without the musculi papillares being extended. If then the musculi papillares be extended by the impulse of the blood during the systole of the ventricle, it is obvious that their extreme state of extension must be at the instant the systole is terminating.

That the musculi papillares are subservient to the action of the auricular valves is not questioned. But those authors whose writings I have perused seem to think, as I have already stated, that they act only as a stay to prevent the valve from being pushed into the auricle; for they consider the valve itself to be opened by the impulse of the blood in its passage from the auricle into the ventricle. Now, it is evident, since the resistance must be equal to the impulse of the force applied, that the musculi papillares cannot act as a stay to the valve against the very powerful impulse which must be communicated at each

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* Bell's Anatomy, Article Heart.

systole, without being extended, and if extended, it follows that they must contract. Now, if we may judge the contraction of the musculi papillares to be any way in proportion to their size and compactness, to the strength of their tendons, and to the power of their antagonist, we shall then undoubtedly have a cause fully equal to produce the sound in question.

My reason for supposing the closing of the semilunar valves to have little to do in causing the sound I am endeavouring to account for is, 1*st*, because they have very limited scope for motion; 2*dly*, because the power which causes the reflux of blood is simple reaction; 3*dly*, because in closing their motion must be somewhat moderated by the pressure of the unexpelled blood yet remaining in the ventricle. For these reasons I am inclined to think that the sound which results from the closing of the semilunar valves in health is so inconsiderable as to be entirely drowned by that arising from the opening of the auricular valves. It is then by the contraction of the musculi papillares that I am disposed to think the auriculo-ventricular valves to be mainly opened; and the stroke of the valves against the sides of the ventricles, in their rapid retraction, I conceive to be the cause of the second of the two successive successions or sounds heard in exploring the action of the heart.

I shall now offer a few remarks on the action of the heart. From what I have already stated, it appears to me, 1*st*, That the auricula is the only portion of the auricle which contracts actively; 2*dly*, That the contraction of the sinus venosus is very limited, and of a passive nature; 3*dly*, That the auricle and ventricle expel only a part of the blood which they respectively contain at each contraction; 4*thly*, That the principal lodgement of the unexpelled blood in the auricle, when the auricula contracts, is the sinus venosus, and in the ventricle, at the termination of the systole of the heart, the channel which leads to the arterial orifice. Let us suppose the right ventricle to be contracting, the blood it contains being strongly pressed raises the tricuspid valve, and its divisions shut the auriculo-ventricular orifice; also it opens the semilunar valves, and a wave of blood passes into the artery. At the instant the contraction of the heart is ceasing, the semilunar valves are in the fossæ valsalvæ, the tricuspid is closed, and the musculi papillares, in resisting the pressure of the blood from pressing the valve into the auricle, are in a state of extension. At the same moment that the contraction of the heart is ceasing, the musculi papillares contract, and by their contraction open the tricuspid valve. Likewise, as soon as the re-action of the artery causes a reflux of blood towards the ventricle, the semilunar valves are raised and closed by the pressure of the blood. If we may judge from analogy, there can be no doubt but that the retraction of the auricular valve is extremely rapid, consequently it must draw along with it a portion of blood from the auricle into the ventricle; and further, the blood lodged between its surface and the sides of the ventricle must be forcibly impelled towards the interior of the cavity. What quantity of blood may be drawn into the ventricle at each contraction of the musculi papillares is a question of no easy solution. However, the resistance which otherwise would be opposed to the passage of the blood from the auricle into the ventricle must be materially lessened by the effect produced by the retraction of the valve. It may be asked, how far the influence of the contraction of the musculi papillares affects the circulation? The effect produced by the retraction of the valves is certainly a source of actual power, that is, motion is generated. Though we cannot ascertain the quantity of blood drawn into the ventricle at each contraction, yet I think we may infer the influence of its operation to be strictly local; for, from the pressure with which the blood is pressed towards the auricle, it appears to me to be very evident that the blood-vessels are in need of no aid to assist them in returning the blood into the sinus venosus; therefore, under this circumstance, any aid would be superfluous. From this view of the subject, I am inclined to consider the influence of the motion generated by the contraction of the musculi papillares to be, as a power of derivation, of no greater service in aiding the vessels to return the blood into the sinus venosus, than the influence of the contraction of the auricula; both contributing simply to the passage of the blood from the auricle into the ventricle. Accordingly, I consider the effect produced by the retraction of the valve of the auricular orifice to be immediately subordinate to the function of the auricle. The musculi papillares, first of all, by retracting the valve, draw along with it a portion of blood into the ventricle; then another portion is impelled into it by the reaction of the sinus venosus, together with the impulse of the blood from the venæ cavæ; and lastly, to complete the requisite extension of the ventricle, the auricula contracts, and instantly, for no perceptible time intervenes, the systole of the heart follows; when again the musculi papillares contract, and so the succession goes on.

It is obvious from this physiological view of the action of the heart, that when the auricular valves close, the semilunar valves open, and *vice versa*. Suppose one of the auricular valves to be cartilaginous and coiled on itself, so as to be incapable of preventing the blood passing through it when closed, would not this lesion both at closing and opening of the valve change the sound from that emitted in the healthy state of the heart, or, according to Laennec's pathological description, produce a "bruit de soufflet," both at the contraction of the ventricle and of the auricle? From my own experience, it would seem to me to require a sense of hearing of more than ordinary delicacy to discriminate, by means of the stethoscope, between lesions of the auricula and those of the semilunar valves. I may state, that since commencing this paper, I have had two *post mortem* examinations of individuals who had been for several months my patients. The sounds emitted in each case were to my ear so alike as to give me every reason to suppose that the valves of the same orifices in both were in a similar state. In one of the cases alluded to, the auricular orifice of the right ventricle was found to be much contracted, the valve coiling upon itself, and its structure fibro-cartilaginous, with gritty concretions. The valves of the other orifices were healthy. In the other case, both the auricular and arterial orifices of the left ventricle were found to be considerably contracted, the valves fibro-cartilaginous and coiling upon themselves, concretions gritty; the edges of the tricuspid valve thickened; the valves of the pulmonic artery were healthy. As I have already remarked, is it not probable, that when the auricular valve is so coiled on itself, as to admit the blood to pass freely through it when closed, the first of the two successive sounds must be changed from that emitted in the healthy condition of the heart? Likewise, when the semilunar valves are similarly altered in their structure, will not the escape of blood from the artery back into the ventricle affect in some measure the second of the two successive sounds? If these queries be true, there can be little doubt but that a sense of hearing of more than ordinary delicacy is required to discriminate between lesions of the auricular and those of the semilunar valves.

Liverpool, June 9, 1829.

ART. VII.—*Case of Poisoning by Arsenic, with observations; and of Fracture of the Ribs, with rupture of the Pleura Costalis, in progress towards a cure.* By EBENEZER GAIRDNER, M. D. Fellow of the Royal College of Physicians, &c.

TO some it may appear superfluous to bring before the public the details of another solitary case of poisoning by arsenic; but the particulars of the case will, I trust, be some apology, especially when we consider the magnitude of the dose, and the satisfactory opportunity that was afforded of directly ascertaining the whole phenomena from the commencement to the termination.

On the 29th of May 1828, about one o'clock, when I was occupied at the Royal Dispensary Hall, a woman arrived in great agitation, to procure assistance for her son, James Burt, aged 17 years, who, she supposed, had been poisoned, as he had just returned home from his work in great distress, vomiting and retching with much violence. It was added, that between nine and ten o'clock he had returned home, where he took heartily his usual breakfast of porridge and milk; and that he had again gone out to his work as a plasterer in a house in the neighbourhood, where under the kitchen-dresser he saw a pie, which he ate up about an hour and a half before his mother applied to me.

I immediately dispatched my son with the necessary instructions, directing him especially to inject water freely for the purpose of washing out the stomach, and to collect and preserve all the egesta. At the same time the gentleman in whose house the patient had been working was sent for.

At two o'clock I found the youth in bed. He was of a dark complexion, moderate size, and muscular. His countenance marked no great anxiety or dejection, and his speech and recollection were easy, distinct, and spirited, but often interrupted by vomiting. The eyes were rather sharp, betokening no great pain, yet considerable uneasiness. He repeated what he had said to my son, that the sensation he felt was heat and uneasiness in the gullet, but more distressing and pungent at the stomach. There was not any tension or increase of pain on pressure in the epigastrium. The pulse was 112, and pretty sharp; the heat of the skin was somewhat above the natural standard; the tongue white and dry, with urgent thirst; and there had been no alvine evacuation since a natural one before breakfast. He also repeated that he was not at all sensible of any peculiar taste in the meat-pie, which he had eaten almost wholly up, leaving only a small morsel of the side crust. About seven pounds of water had already been thrown into the stomach, and was quickly returned by vomiting. But considering the vast importance of having the contents of the stomach discharged as thoroughly and quickly as possible, the injection of water was continued with great diligence; and until this was done, I delayed for a little the drawing of blood, which was also contemplated. Ultimately yellowish mucus, slightly streaked on one occasion only with blood, was ejected. The excessive uneasiness at stomach underwent a slight remission; the vomiting and retching became less constant; and the frequency of the pulse and heat of the surface also declined. The rapid approach of general chilliness, cramps of the legs, and coldness of the extremities, evinced that a collapse was hastening on, which contraindicated the venesection. A mixture of mucilage with the sulphuret of potash was now exhibited, but it was almost all immediately rejected. Fomentations with sinapisms to the legs were applied.

About four o'clock he passed a very copious stool, which was rather loose, without any tinge of blood; and in passing it he suffered no pain. Towards six o'clock he was drowsy, very sensible of cold, and still vomiting occasionally. The vomited matter was chiefly yellowish fluid intermixed with mucus. There was still no pain or tenderness at the epigastrium, and the uneasy burning sensation before described in that quarter had almost completely subsided; but the cramps were extending upwards, and the temperature of the extremities sinking. The pulse was not above 70, and small, and the heat of the trunk was below the natural standard. About seven o'clock he passed by stool, without any marked pain or tenesmus, an ash-coloured fluid resembling dirty water, with some yellow mucus, similar to that contained in the vomited matter, and free from any blood. There was a general sinking of the vital powers, with increasing drowsiness. Between eight and nine o'clock the pulse was small and irregular, varying from 70 to 140. Mouthfuls of the same kind of yellowish fluid continued to be occasionally discharged without any seeming effort.—He was quite sensible and collected when spoken to, maintaining as before that there was no pain whatever at the stomach or belly, but still a very slight sensation of heat in the former; and though he swallowed very readily any fluid that was given, the thirst was not urgent. The cramp was extending to the abdomen, but did not cause much suffering.—From this time he continued quiet and drowsy; and at two o'clock on the following morning, he expired almost unperceived, fourteen hours and a-half after the poison had been swallowed.

Besides the sulphuret of potash, albuminous and chalky mixtures were exhibited, and also antispasmodic injections. The mucilaginous sulphuret was better retained than the mixture of albumen and chalk.

The body was examined twelve hours after death, in the presence of several medical gentlemen.

The countenance was pale and quite placid. The muscles of the body were strongly defined and rigid, being in a state of spastic contraction. The abdominal muscles in particular were hard and very tense. The penis was without any peculiar redness, relaxed, and of the usual appearance. There was some lividity, chiefly on the dependent parts of the trunk and thighs, but no ecchymosis or œdema. In moving the body to the table, there were discharged from the mouth several ounces of a fluid, which was slightly viscid and of a yellowish-brown colour.

On dissecting the muscles of the thorax and abdomen, they appeared of a peculiarly deep-red colour and firm texture. There was no effusion in the pleural cavities; but the vessels of the costal pleura were injected, and towards the spine presented a vivid arborescent appearance and a general diffused blush, without any morbid adhesion. Having been previously apprized of a severe injury which the patient had received some years before, and which shall be afterwards noticed more particularly, we found a deficiency in the left costal pleura, forming two small apertures, surrounded by a cicatrix of considerable size, at the fifth and sixth ribs; yet these parts were otherwise in a very healthy condition. Both lungs continued completely inflated after the chest was opened—appearing as if they were too large for the capacity of their cavities. The pericardium contained about an ounce of straw-coloured fluid, which was retained for future examination. The heart was of the natural size, but was strongly contracted and felt hard like cartilage; and it partook of the same deep-red tinge as the other muscles. Its left side was empty, while the right ventricle and auricle were full of dark fluid blood.

There was no effusion into the abdominal cavity, and the peritonæum generally was quite natural. The liver was florid with a little excess of blood, but otherwise healthy; and the gall-bladder was partially filled with bile of a yellowish-green colour. The small omentum was very red, otherwise natural, but the large one was not so injected. The spleen was pretty natural but very firm. The pancreas was also firm and somewhat redder than usual. The mesentery was very slightly injected, and contained several tubercles between its layers.

Externally, portions of the stomach at the great curvature appeared of a red colour, which deepened in intensity, and became more general towards the pylorus, but which seemed to be transmitted from the inferior coats through the peritonæum. At this extremity the organ was more than usually contracted, and peculiarly firm and hard; and a considerable quantity of fluid was contained in it. After applying ligatures above the cardia and below the pylorus, we separated and removed the entire stomach; and from a section made into the great curvature, it was emptied of the contents—a yellowish viscid fluid with some flocculi. The villous coat was but slightly reddened towards the cardia, and partially so in the great curvature, with some vivid spots having specks of yellowish-white crust; but towards the pylorus the redness was general and of a deeper hue. Here its rugæ were enlarged and peculiarly prominent, and there was a spot, rather more than an inch in diameter, having a deep-red base and a granular surface, in part covered, but more largely and thickly than the small spots, by the same coloured dryish crust. This crust was in part scraped off and preserved with the fluid contents. It was at first conceived that these crusts might be in part the product of the sulphuret of potash swallowed by the patient; but this was found to be impossible from the minute quantity taken. A portion of the villous coat being carefully dissected from the muscular where the large encrusted spot was, both of these, as well as the intervening delicate cellular texture, were found quite entire, with the exception only of some thickening of the villous. A preparation of this portion of the stomach dissected has been preserved.

The duodenum was also considerably injected internally, but quite sound in texture; and the jejunum and ileum were likewise red in many parts. A lumbricus, five inches in length, was found quite lively in the ileum. The cœcum was only slightly reddened, while the large intestines were throughout their whole extent almost perfectly white, having only delicate red lines interspersed. The colon was much constricted, so as to resemble a firm cord about the size of the index-finger. It was still less in size at the sigmoid flexure; but the rectum was inflated to a very considerable size. The urinary-bladder was much contracted, and contained about two or three ounces of urine. Its mucous coat was whitish, with some red and blue vessels spread through it.

Though from the beginning we suspected that the poison swallowed by the youth was arsenic, yet it was not till ten hours afterwards that this was ascertained from the gentleman in whose house the accident happened. A half-gallon jar, about one-third full of the white oxide, had been usually, with the most culpable negligence, left in an open press. From the large mouth of this vessel two females of the family had, without any measure, shaken out the poison into the pie, which they had intended for rats. The exact quantity thus used we afterwards took measures as far as possible to ascertain, and we arrived at the conclusion, that it must have somewhat exceeded half an ounce. Nevertheless, the vomited matter and contents of the stomach were by my son Meredith and his fellow student Mr Cocks, subjected to analysis by the tests of the ammoniacal sulphate of copper, ammoniacal nitrate of silver, lime-water, and sulphuretted-hydrogen; and also to the test of sublimation by the flux of charcoal and carbonate of potass; and all these tests, with the exception of the lime-water, gave the most decided results. Part of the fluid found in the pericardium having escaped, about two drachms of what remained, which was mixed with a little blood, yielded no indication of arsenious acid by any of the first four tests. Nor by these did about an ounce of turbid, milky-white urine, having a tint of red, give any indication of arsenic. It may be mentioned, that the urine coagulated on being subjected to heat.

Considering narrowly all the phenomena which were exhibited in this case, I am induced to ascribe death, not to any congestion or other injury produced in any organ, or in the system generally, by the poison, but to its operation on the nerves,—those especially which are the medium of muscular action. Thus, we witnessed the cramp or tonic spasm, without any well marked atony, beginning in the lower extremities and proceeding upwards, until the heart itself was affected.

Notwithstanding the valuable experiments of many eminent men on arsenic, and the numerous cases of its action on the human subject that have been published, and ably commented on, it is painful to remark so much discrepancy and want of precision among medical men as to facts, when they present themselves as medical jurists. If recorded cases, however, are carefully examined, it will be found that in a great proportion, on account of the accompanying moral circumstances, there is much doubt and uncertainty; and that there are few where the whole facts, from first to last, have come, without any disguise, under the personal observation of the physician, from which alone clear and conclusive inferences as to the effects of the poison can be drawn. It is material that he be acquainted with the quantity and the time of exhibition of the poison, and also whether it was received on a full or empty stomach, seeing that its effects vary much on account of differences in these respects. Neither should he altogether overlook idiosyncrasy, which may itself be overcome by small doses dexterously exhibited, after which the system may by degrees endure without danger what at first would have been poisonous. And further, there may be a peculiar morbid state of the constitution, as is occasionally the case in intermittent fever, where the same dose of this mineral will act beneficially, which otherwise might prove poisonous indirectly, if not immediately.

With the view of aiding the physician in this investigation, Hahnemann, who has been since mainly supported by Dr Duncan, has divided the cases of poisoning by arsenic into three degrees; 1*st*, when death occurs within twenty-four hours after its exhibition; 2*d*, when death takes place later than twenty-four hours; and 3*d*, when the case, though attended with dangerous symptoms, does not terminate fatally. This classification he submitted to the profession a number of years ago with much valuable information; and it was brought more immediately before the British public with great ability and pains by Dr Duncan, who illustrated it by reference to various recorded cases.* Of these cases, very few which belong to the first class or degree present a full and accurate detail of all the phenomena. This deficiency is most likely to occur in cases of intended murder; the very instances where it is especially desirable that there should be the least doubt as to the facts.

Very recently, in the course of the investigation of some atrocious cases, Dr Christison has made some valuable additions to the toxicology of this poison. He has also made some advances in pointing out its specific diagnosis in the human body, which he has founded on the symptoms and phenomena of the cases generally, without reference to the extent of the dose or period of death. But, however desirable it certainly is to establish the diagnosis of cases of poisoning with arsenic considered generally, I am inclined to think that this can only be attained satisfactorily by forming in the first instance a correct classification.

The present case comes under Hahnemann's first class,—where the dose of the arsenic is great and proves fatal within twenty-four hours. The symptoms and morbid appearances correspond in many points with those already published of this degree; but the only case I have met with which bears a close resemblance to the present, is one related by Dr Yelloly in the fifth volume of the Edinburgh Medical and Surgical Journal. This was the case of a youth, sixteen years of age, whose legs were also spasmodically affected during life; but in the dead body no mention is made of rigidity in any of the muscles. This is particularly noticed, however, in other instances; but in no case do we find in the dead subject so great a general rigidity mentioned, or that the heart was likewise found so affected.

It was here observed that the general excitement at first, though sufficiently marked, was nevertheless not great, and but very transient. There was not any sweating or rigor or rapid respiration; but there was chilliness, and spasms which increased progressively without any reaction, delirium, or convulsions. There was no tenderness or distension at the epigastrium, no hiccup, and no difficult deglutition or syncope,—the usual attendants of severe gastric affections. There was only on one occasion a slight tinge of blood in the vomited matter, and that rather at the early stage, and after the organ had been excited by the pouring in of the water. The diarrhœa was without tenesmus or blood. The sensations of cramp did not seemingly commence in the stomach, the primary and immediate point of contact with the poison, but in the lower extremities; and they progressively advanced upwards to the trunk. The patient complained of them as painful and uneasy only when questioned. In his appearance there was not any indication of exquisite suffering; on the contrary, as before-mentioned, he remained quiet and at rest. Neither was there ever any symptom of palsy.

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* See this Journal, Vol. vii.

Still it cannot be doubted that there were present in this instance some of the symptoms which are usually met with in acute idiopathic gastritis; and that the nervous affection resembled the severe tonic spasms which constitute the peculiar indication of spasmodic cholera. Seeing that guilt and sophistry will, to conceal the truth, avail themselves of these resemblances, and not without success, it is of the utmost importance that the physician, aware of the delicate and important situation in which he stands, should in a parallel case, by an early investigation of every circumstance, moral as well as physical, be duly prepared to establish all the essential facts. As has been recently remarked by Drs Abercrombie and Christison, and confirmed by every physician of considerable practice, acute gastritis is very rare as an idiopathic disease, and almost uniformly proceeds from swallowing acrid or cold substances. Hence, when a medical man is called and witnesses the symptoms of acute gastritis, his suspicions must naturally lead him to trace and ascertain whether these substances may not be the cause.

To mark the diagnosis of spasmodic cholera from that of poisoning with arsenic, or other acrids, would certainly be difficult were the symptoms during life only in view without the attending circumstances. It is true there is not in cholera that peculiar heat and uneasiness of the gullet or the vomiting of blood which is present in most cases of arsenical poisoning. Spasmodic cholera, besides, is seldom met with in this country, and only in warm and peculiar seasons, and very rarely in isolated cases; and it hardly ever exhibits such direful spasmodic symptoms as the cholera of India, or such as accompanied this case of arsenical poisoning. Hence, though there may be some grounds to perplex and raise doubts as to the fact of poisoning in a juridical point of view, strong presumptive evidence may sometimes be derived from the medical circumstances, without reference to chemical analysis. The other attending circumstances, and, above all, the examination of the vomited matter or contents of the stomach and bowels, and the inspection of the body, will establish the case beyond all doubt.

It is worthy of remark in the present instance, that, notwithstanding the overpowering dose of the arsenic, a lumbricus was found in the dead body in a lively state,—demonstrating that this species at least of human intestinal worms is invulnerable by this mineral, and tending to invalidate the hypothesis of Dr Alston and some others, who have ascribed the anthelmintic virtue of tin-filings to a slight admixture of arsenic.*

As above hinted, before the inspection of the body was begun, the father, a very intelligent tradesman, who was desirous of affording every information, stated that his unfortunate son, when eleven years of age, had received nearly a fatal injury, by a loaded cart having passed over his body. The left arm above the elbow, and several of the ribs of the same side were broken, and the breast bone was dreadfully crushed. At first the case was considered quite hopeless; he was, however, bled freely, and with great immediate relief; but the recovery was ultimately slow. For a considerable time afterwards, when he breathed, the lungs protruded at the left side, and appeared to be only covered by the skin,—in fact, a *hernia pulmonum* was formed. Although his medical attendants, Dr Renton of Pennicuick and two other surgeons, had no hope of his recovery, yet the tumour gradually became less, and ultimately disappeared; and he afterwards got so stout, that for two years back he had been able to go through his work with such vigour as to be a very considerable help to his family. In order to ascertain what changes had been produced, the chest was opened with great caution; and we found that the sixth rib, though quite firm, and maintaining the due arch of the cavity, was bent and formed a small segment of a circle towards the inferior rib. Within this segment there were two holes in the pleura, about the size of half-an-inch in their longest diameter; and the pleura formed a kind of valve over a small portion of each of them. There was likewise some imperfection in the intercostal muscles. The edges and the parts immediately around were delicately thin, like arachnoid texture, as if the healthy process of renovation of the lacerated parts had been going on during life towards a natural and complete cure. The external muscles and integuments were so complete, that no other marks of the injury could be observed. There was not any morbid attachment of the pulmonary pleura whatever.

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* In poisoning by arsenic it has been remarked, that the dead body acquires a peculiar antiseptic quality. I am not aware, however, that any satisfactory cause has been assigned for this. We know that many substances, vegetable as well as mineral, give this quality to the animal body by corrugating the substance of the textures; and John Hunter says, that "the strength of coagulation (of the blood) was something similar to the strength of contraction in a muscle, resisting putrefaction." May not then this antiseptic power of arsenic be ascribed to its property of inducing corrugation? And may not the large and prominent rugæ of the stomach generally produced in such cases proceed from spasmodic contraction of its under muscular coat?

We were allowed to cut out and carry off the parts, which now form a very interesting preparation,—affording a beautiful specimen of what nature will accomplish in the reparation of injuries.

Argyle Square, July 1829.

Art. VIII.—*A Sequel to Reports on the Diseases of Plymouth.* By Edward Blackmore, M.D. Physician to the Plymouth Public Dispensary, and Member of the Plymouth Institution.

It is unquestionable that a knowledge of pathological anatomy and of the materia medica is alone insufficient to render a physician accomplished in his foreknowledge of the events of diseases, or in his power of arresting their ravages. An art which is conversant with perpetually varying combinations of morbid symptoms, and with ever new peculiarities in the habits and susceptibility of individuals, can derive little aid from the results of a few examples of disease, however skilful may be the analytic process by which the investigation is conducted.

The art of medicine requires the formation of laws and principles the most general and comprehensive. This science, which is confessedly the lowest among the physical sciences in the certainty of its rules and in its energy, can only approach to perfection in proportion as its range of observation and induction is extended. The writer conceives that in the present day the method of studying medicine is too exclusively analytic. The spirit of the French revolution has pervaded the schools of science:—the facts which the labours of former ages had accumulated have been rejected in scepticism, or forgotten in neglect. Modern analysis has indeed been successfully employed in raising new and more precious materials: but synthesis, generalization, comparison, combination, is essentially requisite in order to impart to individual facts their true and highest value, and to generate efficient knowledge.

A remark on the ancient and modern prognosis in medicine will illustrate this principle, and show the relation of statistical with practical medicine. The prognosis of the Greek physicians was derived from the history of diseases; the result of a synthetical conclusion from their known ordinary course: and from the regularity in the course of nature their judgment was singularly accurate. The prognosis of the moderns is drawn from the physiological interpretation of existing symptoms, the conversion of symptoms into signs: it is the result of analysis applied to the particular cases. And in this we have a vantage ground superior to the ancients. But by disuse of the synthetical mode of observation which Hippocrates pursued, the prognosis of the physiological physician, although more exact than that of the Greeks as far as it extends, namely to the interpretation of any existing diseased condition, falls short of foretelling the conversion and remote issue of diseases, which can be known only from what has generally happened before in similar circumstances.

One grand virtue of statistical medicine is, that it promotes the knowledge of general results. It also conduces to the diagnosis of diseases, as it obliges the practitioner to form a definite notion of them: and by the enlarged comparison of different registers which it enforces, it reveals to each observer those peculiarities of professional vision, the *idola fori*, *specus* or *tribus*, which distort the aspect of nature, and render unstable the foundations of natural science. Were comparison and co-operation to be more employed in the cultivation of medicine, the science would not now merit so largely the reproach which Lord Bacon cast upon it two centuries ago. "Medicine hath been more professed than laboured, and yet more laboured than advanced; the labour having been rather in circle than in progression: for I find much iteration, but small addition."

In no branch of natural science, indeed, is the labour of comparison so necessary, so arduous, and so fruitful. Numerous statistical registers of diseases lie scattered throughout various periodical works like the fragments of a ruined temple, which, remaining as isolated facts, have been of little utility for the elucidation of the attributes of diseases; but when made the subjects of legitimate comparison they would become abundantly instructive. Many of these, however, are valueless, from the rude and broken form in which they are given,—the accumulation of them not having been directed to the developement of any general principle; so that one has yet the labour of preparing new materials as well as of combining those which exist.

Such statistics are interesting, as they develope the revolution in the reign of particular diseases, which present phenomena equally curious and important. "Most of the ancient writers," says Dr Ferriar, "agreed that new diseases were frequently arising. Glisson assures us that the rickets were first known in England thirty years before he wrote. The croup was notoriously a disease unknown to physicians within these thirty years, and is still confined in great measure to the eastern coast of the kingdom. The leprosy was described a few years ago as a very acute and fatal disorder in one of the provinces of France; and Mr Hunter has given good reasons for believing that new poisons are now produced among the poor of great cities."—"It is curious to observe," says Dr Percival, "the revolution which has taken place within this century in the constitutions of the inhabitants of Europe. Inflammatory diseases more rarely occur, and are much less rapid and violent in their progress than formerly. Nor do they admit of the same antiphlogistic method of cure which was practised with success a hundred years ago. Sydenham makes forty ounces of blood the mean quantity to be drawn in acute rheumatism, whereas this disease as it now appears in the London Hospitals (1772,) will not bear above half that evacuation. This advantageous change, however, is more than counterbalanced by the introduction of a numerous class of nervous ailments, in a great measure unknown to our ancestors, but which now prevail universally, and are complicated with almost every other distemper. The hypochondria, palsies, cachexies, dropsies, and all those diseases which arise from laxity and debility, are in our days endemic everywhere; and the hysterics now attack both sexes indiscriminately."—"Scarlet-fever," says Dr Hawkins, "consumption, gout, dropsy, palsy, apoplexy, mania, are now more prevalent than formerly." The present essay may serve to show how far those remarks describe the constitution of diseases in this age.

Another important end which such an inquiry will accomplish is to enable physicians to form a just estimate of the danger of certain diseases; and consequently to direct the energies of their skill to the kind of danger which is proper to the necessities of each age. For it is unquestionable that many persons have fallen the victims of maladies, which, as being generally deemed innocuous, and requiring more the nurse than the physician, the routine practice of the profession has been inadequate to oppose and subdue. That doctors differ,—that medicine is an uncertain and a conjectural art,—that its practice is perpetually inconstant,—are reproaches vulgarly notorious, and which have more or less undermined public confidence in the profession. If statistics can show that diseases themselves, by the appointment of Divine Providence, as well as from known changes in the habits of mankind or in the seasons, do revolve and exhibit changes in their essential characters,—that therefore revolutions in the medical cure of them are not capricious and baseless,—the science of medicine will appear to partake more of the dignity and certainty of other natural sciences.

Caution should be observed in making the relative mortality exhibited by the following statistical tables the basis of conclusion as to the comparative merits of various modes of medical practice in the different institutions and places which are enumerated. The extreme variations in their mortality are such as cannot be ascribed to any possible variety in the method of cure: and large observation evinces that such mortality is more affected by various other natural circumstances than by medicine. "A friend," says Dr Bisset Hawkins, "made notes on the comparative mortality under three physicians in the same hospital; one was *expectant*, one *tonic*, the other *eclectic*. The mortality was the same;—but the length of the disorder, the character of convalescence, and the chances of relapse were very different."

A statistical inquiry should be so conducted as to illustrate these three objects,—the climate and various natural circumstances of a place,—the manners of the people,—and the state and efficiency of the art of medicine. In order to achieve these objects, the following rules of comparison should be observed: *First*, The reports of single years should not be employed to show the comparative obnoxiousness of different places to particular diseases, but the combined reports of periods sufficiently long to embrace the average reign of epidemics; and the reports are to consist of entire years, or of an equal number of similar seasons. The relative mortality of particular diseases may, however, be adduced from a minor scale of observations. *Secondly*, The periods collated should be coincident in time, otherwise the revolutions which diseases undergo in the lapse of years prevents an accurate conclusion as to the relative medical topography of places. *Thirdly*, When exact conclusions are to be drawn regarding the comparative efficiency of medicine and the healthiness of places, similar institutions only can be compared.

Such an essay as the present, it has been remarked, is defective from omitting all reference to population: but I conceive that the comparative frequency and mortality of particular diseases *inter se* is not only a topic properly distinct from disease and death in reference to population, which belongs more to the political economist, but likewise that it is an inquiry more proper to the physician, as developing the comparative importance of the several maladies which demand his skill, and as guiding his study of their remote causes.

As the designations of diseases are infinitely diversified, we cannot be certain that the same disorder is expressed by the same minute nosological term in different registers; for what one physician terms *Diarrhœa*, another may designate *enteritis erythematica*, or even *infantile remittent fever*. I have therefore in the following table combined those morbid affections which are so palpably distinct as almost certainly to comprise similar examples. And I presume that the numerical variations which are exhibited in the sections of diseases combined in groups according to the distinct organs affected, are as certain and positive as the nature of the subjects compared will admit.

The ratios of relative mortality here given for Plymouth may be supposed to express the true comparative danger of such particular diseases, as the scale is much larger than that contained in my former essay, and as I have used the register of the Poor House Hospital, which contains a fair proportion of mild and severe cases, as a corrective of the dispensary tables.

As Huxham has not given the positive number of his cases of particular diseases, I have attempted to render his register a fair subject of comparison with the other registers, by taking the several distinct notices of diseases in his Epidemics during twenty years at the middle of the last century. I shall again notice in the present paper the comparative incidence of disease and death in the distinct sexes, only in those instances where the following tables are opposed to the more contracted register given in the April number of this Journal.

I have to acknowledge gratefully the abstract of the reports of the Exeter Dispensary, with which Dr T. Foster Barham has favoured me, and a very important and minute register of the Clifton Dispensary from Dr Howell. The sections of the Edinburgh New Town Dispensary I have combined from the register of Dr Moncrieff, which is published in Dr B. Hawkin's Medical Statistics. This register, extremely interesting as it is, would have been still more important had the number of males and females sick of the different diseases been noted. Dr Clarke's register of the Nottingham County Hospital, published in former volumes of this Journal, is an admirable example of statistical enumeration. The register termed Arracan is drawn up from the admirable reports of Mr R. N. Burhard on the sickness in the European corps in the Burmese War during 1825, which are published in the Transactions of the Medical Society at Calcutta. The *Army* 1809, in the following tables, is an interesting record of the sickness in the troops who retreated from Spain; for which, as well as for many others, I am indebted to the early volumes of the Edinburgh Journal. I have to regret that I cannot avail myself of the minute register of the diseases incident at the Edinburgh New Town Dispensary for 1816–19, as the reports do not comprise all the seasons of the several years.

In the subsequent comments, I shall remark on the comparative frequency and mortality of particular diseases, *first* in the same places or institutions at different periods; and *secondly*, in different places at the same period; so as to contrast the result of hospital with dispensary practice, and of civil with naval and military institutions.

TABLE I.—Anasarca and Ascites.

Place and Period.	Sick.	Deaths.	Total patients.	Relative frequency, 1 to	Relative mortality, 1 to
Plymouth. Six late years,	58 *m.* 138 *f.* 196	16 *m.* 27 *f.* 43	11416	58	4.5
Plymouth. 1799–1805, (Woolcombe)	112	13	4409	40	9
Exeter Disp. 1825–7,	103	5	2314	21.3	20.6
Clifton Disp. 1813–16, *	27	8	1699	62	3.4
Clifton, 1824–8, †	30	5	3167	105.5	6
London, 1798, ‡	77	12	2862	37	6.4
Do. Carey St Disp. 8 years,	472		20876	44	
Edin. Disp. 1821–4,	145	23	18809	130	6.3
Dub. Disp. several years,	577		17229	30	
Do. by Dr O'Brien,	311		10304	33	
Liverpool Disp. 1805, §	273		12203	49	
Norwich Disp. 1808,	15		611	40	
Notting. Disp. 1807–11,	35 *m.* 42 *f.* 77		9859	128	
Sir J. Blane, 1783–1806,	126 *m.* 76 *f.* 202	43 *m.* 33 *f.* 101	7651	26.4	2
Do. private practice, 10 yrs.	51	11	3816	75	4.6
Plym. Nav. Hosp. 1806–9,	41	14	1984	48	3
Army, 1809,	9	1	3588	398	9
Glasgow Infirmary, 1810,	39		936	24	
Berlin Hosp. 1801–4,	221		9701	44	
Seringapatam, 1811–13, ‖	27	3	2886	107	9

* Dr Chisholm. † Dr Howell. ‡ Dr Willan.
§ Dr Dawson. ‖ Dr Nicoll.

TABLE II.—Asthma, Dyspnœa, and Hydrothorax.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
Author and Ply. Disp. (late yrs.)	122 *m* 113 *f* 235	17 *m* 11 *f* 28	80 *	8.4
Ply. 1799–1805,	252	21	17.5	12
Clifton Disp.	83	7	20	12
Clifton,	623	1	25	
Edinburgh, †	50	22	376	2.2
Dublin Disp.	3849		4.4	
O'Brien do.	1894		5.4	
Liverpool,	876		14	
Lond. (Willan,)	310		9	
Cary Street Disp.	2440		8.9	
Nottingham,	92		107	
Blane, private,	105	16	36	6.6
R. N. Hosp. Ply.	46	7	43	6.6

* Total sick of all diseases, 18671.
† Cases of hydrothorax only.

TABLE III.—Apoplexy and Paralysis.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
Author and Ply. Disp.	52 *m* 63 *f* 115	11 *m* 8 *f* 19	76	6
Ply. 1799–1805,	52	10	84	5.2
Lond. (Willan,)	37	5	79	7.4
Cary Street Disp.	232		90	
Edinburgh,	46	15	404	3
Clifton Disp.	24	7	73	3.4
Clifton,	31	6	102	5
Liverpool,	433		29	
Dublin Disp.	111		155	
O'Brien, do.	56		184	
Berlin,	125		79	
Nottingham,	108		91	
Blane, private,	36	19	106	2
Blane, general,	204	20	37	9
Ply. Naval Hos.	31	4	64	8

TABLE IV.—Carditis ac Cordis Vitia.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	 mort. 1 to
	35 *m* 37 *f*	4 *m* 9 *f*		
Recent Plymouth,	72	13	158	6
Ply. 1799–1805,	6	1	735	6
London (Willan)	21	1	136	
Cary St Disp.	63		329	
Edinburgh,	23	13	818	2
Clifton Disp.	12	3	141	4
Clifton,	8	2	396	4
Liverpool,	73		165	
Dublin Disp.	135		127	
O'Brien do.	79		130	
Nottingham,	2		4929	
Blane, private,	26	6	146	4.3
Plymouth N. H.	4		496	

TABLE V.—Cynanche—*Cullen's Genus.*

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	 mort. 1 to
	100 *m* 154 *f*	7 *m* 3 *f*		
Recent Plymouth	254	10	48	25
Ply. 1799–1805,	31	1	142	31
Huxham,	41		18	
London (Willan)	55		52	
Cary St Disp.	284		73	
Edinburgh,	38	3	498	12
Exeter,	24	5	96	5
Clifton Disp.	23		73	
Clifton,	38	2	84	19
Liverpool,	223		56	
Dublin,	666		26	
O'Brien,	128		80	
Nottingham,	131		75	
Blane,	114	7	68	16
Do. private,	84	5	45	17

TABLE VI.—Convulsio, Epilepsia, Chorea, Tetanus.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	 mort. 1 to
	64 *m* 60 *f*	5 *m* 8 *f*		
Recent Plymouth	124	13	70	9.5
Ply. 1799–1805,	55	5	80	11
London (Willan)	20		143	
Cary St.	130		160	
Edinburgh,	25	13	750	2
Clifton,	35		90	
Liverpool,	154		80	
Dublin,	36		480	
O'Brien,	22		468	
Blane, private,	33	4	231	8
Plymouth N. H.	37	1	53	37

TABLE VII.—Bronchitis, Catarrhus, and Pneumonia.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	 mort. 1 to
	553 *m* 698 *f*	45 *m* 33 *f*		
Recent Plymouth	1251	78	7	16
Ply. 1799–1805,	320	23	18	14
London (Willan)	149	4	19	37
Cary Street D.	1740		12	
Edinburgh,	2060	62	9	33
Exeter,	36	2		18
Clifton Disp.	218	3	8	72
Clifton,	341	18	9	19
Dublin Disp.	1548		11	
O'Brien do.	1321		8	
Liverpool,	161		79	
Army,	173	5	21	34
Plymouth and Haslar Hosp.	423	80		5.3
Army Arracan,	35	6	75	6
Plymouth N. H.	308	82	6	3.7
Blane private,	426	26	9	16
Do. pneumonia alone.	155	26		6
Nottingham,	798		12	

TABLE VIII.—Cholera Diarrhœa Melæna.

Place and Period.	Sick.	Deaths.	Relative] freq. 1 to	 mort. 1 to
	267 *m* 255 *f*	10 *m* 11 *f*		
Recent Plymouth	522	21	16	29
Ply. 1799–1805,	301	12	14	25
Willan, London,	115		25	
Cary St.	820		25	
Edinburgh,	524	18	36	29
Exeter,	556	19	5	29
Clifton,	145	2	22	72
O'Brien,	451		23	
Dublin Disp.	804		21	
Liverpool,	388		31	
Blane private,	198	9	20	22
Nottingham,	126		79	
Plymouth, N. H.	39	6	51	6
Arracan,	158	14	80*	11
† India, Europeans,	767	211		3.6
Do. Natives,	4065	1544		2.6
Seringapatam,	617	14	4.6	44

* Total sick of all diseases 2631.

† Annesley.

TABLE IX.—Dyspepsia, Asthenia, Hypochondrias.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
	170 *m* 588 *f*.	4 *m* 1 *f*		
Recent Plymouth	758	5	11	151
Ply. 1799–1805,	369	0	12	
Willan, London,	411	1	7	
Cary Street,	2805		7	
Exeter,	32		74	
Clifton Disp.	21		80	
Clifton,	261	3	12	87
Dublin Disp.	1067		18	
O'Brien Do.	483		21	
Nottingham,	920		11	
Blane private,	316	1	11	
Plymouth, N. H.	130	14	15	9

TABLE X.—Dysenteria, Enteritis, Peritonitis.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
	154 *m* 296 *f*	19 *m* 21 *f*		
Recent Plymouth	450	40	19	11.2
Ply. 1799–1805,	9	1	489	
Willan, London,	55	1	52	55
Cary St. Disp.	441		48	
Edinburgh,	85	27	221	3
Nottingham,	50		197	
Chisholm,	48	3	35	16
Howell,	65	4	48	16
Dublin Disp.	408		42	
O'Brien Do.	277		38	
Plymouth and Haslar Hosp. 1808–1814,	90	13		7
Blane, private,	67	11	114	6
Plymouth, N. H.	97	25	20	4
Arracan army,	318	41	8	8

TABLE XI.—Erysipelas.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
	33 *m* 45 *f*	2 *m* 3 *f*		
Recent Plymouth	78	5	146	15.6
Ply. 1799–1805,	11		400	
Huxham,	11		67	
Willan, London,	4		713	
Cary Street,	55		379	
Edinburgh,	93	8	202	12
Clifton Disp.	16		105	
Clifton,	14		226	
Liverpool,	57		214	
Dublin Disp.	105		164	
O'Brien Do.	66		150	
Nottingham,	12		821	
Blane,	109	3	70	36
Do. private,	92	1	42	
Plymouth, N. H.	5	1	396	

TABLE XII.—Gastritis, Hæmatemesis.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
	128 *m* 221 *f*	7 *m* 8 *f*		
Recent Plymouth	349	15	25	23.2
Ply. 1799–1805,	7		629	
Willan, London,	9		318	
Cary Street,	47		444	
Edinburgh,	18	8	1044	2
Clifton Disp.	13		130	
Clifton,	1			
Dublin Disp.	15		1148	
O'Brien Do.	27		381	
Army,	1	1		
Blane, private,	16	2	239	8
Plymouth, N. H.	5	2	397	

TABLE XIII.—Febris Infant Remittens, and Acute Infantile.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
	43 *m* 54 *f*			
Ply. Poor-House,	97*		28	
Willan, London,	127	14	23	9
Cary Street,	591		30	
Edinburgh,	151	7	124	21
Clifton,	112	4	29	28
O'Brien,	231		44	

* Total sick of all diseases, 2700.

TABLE XIV.—Hepatitis, Icterus.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
	43 *m* 110 *f*	4 *m* 2 *f*		
Recent Plymouth	153	6	57	25.5
Ply. 1799–1805,	30		146	
Huxham,	8		92	
Willan, London,	20	1	143	
Cary Street,	185		113	
Edinburgh,	104	17	180	6
Clifton Disp.	135	6	13	22
Clifton,	74		43	
Liverpool,	44		280	
Dublin Disp.	129		133	
O'Brien Do.	104		99	
Nottingham,	78		126	
Blane, general,	100	15	76	7
Do. private,	71	6	53	12
Plymouth N. H.	60	6	33	10
Glasgow,	15		62	
Army, 1809,	47	1	75	
Arracan,	19	1	139	
Nicol,	76	4	38	19

TABLE XV.—Phthisis and Hæmoptoe.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
	100 *m* 154 *f*	22 *m* 41 *f*		
Recent Plymouth	254	63	34	4
Ply. 1799–1805,	225	77	13	2.9
Willan, London,	112	37	26	3
Cary Street,	955		21	
Edinburgh,	429	93	43	4
Clifton Disp.	86	24	19	3.6
Clifton,	37	31	86	1.2
Liverpool,	331		40	
Dublin Disp.	942		18	
O'Brien Do.	229		45	
Norwich,	81		7.5	
Army, 1809,	25	17	143	1.5
Berlin,	930		10	
Nottingham,	450		22	
Blane, private,	165	68	23	2.4
Plymouth N. H.	308	117	6	2.6

TABLE XVI.—Phrenitis and Hydrocephalus.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
	82 *m* 70 *f*	18 *m* 16 *f*		
Recent Plymouth,	152	34	57	4.5
Ply. 1799–1805,	9	4	586	2
Willan, London,	5	3	572	2
Cary Street,	99		210	
Edinburgh,	81	61	232	1.3
Blane, private,	18	13	425	1.4
Clifton Disp.	43	8	39	5.4
Clifton,	18	5	176	3.6
Dublin,	42		410	
O'Brien Do.	11		936	

TABLE XVII.—Pertussis.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
	59 *m* 53 *f*	5 *m* 7 *f*		
Recent Plymouth,	112	12	101	9.3
Ply. 1799–1805,	60	9	73	6.4
Huxham,	28		27	
Willan, London,	35	3	81	12.6
Cary Street,	180		111	
Edinburgh,	117	22	160	9
Clifton Disp.	18	2	94	9
Clifton,	16		198	
Dublin Disp.	15		1148	
O'Brien Do.	10		1030	
Nottingham,	34		291	
Blane, private,	31	5	246	6

TABLE XVIII.—Rheumatism, Arthritis, Podagra.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
	333 *m* 417 *f*	1 *m* 1 *f*		
Recent Plymouth,	750	2	15	375
Ply. 1799–1805,	299		15	
Huxham,	65		11	
Willan, London,	209		13	
Cary Street,	1252		16	
Clifton Disp.	114	1	15	
Clifton,	251	1	12	
Nottingham,	368		27	
Blane,	1010	17	8	60
Plymouth N. H.	200	5	10	40
Berlin,	589		17	
Army, Ports.	255	3	14	85
Do. India,	184		16	
O'Brien, Dublin,	725		14	
Dublin Disp.	1354		13	
Liverpool,	656		18.6	

TABLE XIX.—Rubeola.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
	103 *m* 96 *f*	6 *m* 9 *f*		
Recent Plymouth,	199	15	60	13.2
Ply. 1799–1805,	71	6	63	12
Huxham,	45		16	
Willan, London,	27	2	140	14
Cary Street,	288		72	
Edinburgh,	436	29	43	15
Nottingham,	66		148	
Clifton Disp.	55	5	31	11
Clifton,	78	4	40	19
Blane,	32	3	240	11
Dublin Disp.	108		159	

TABLE XX.—Scarlatina.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
	19 *m* 42 *f*	0 *m* 1 *f*		
Recent Plymouth,	61	1	187	61
Ply. 1799–1805,	63	5	70	12.4
Willan, London,	46	7	62	6.6
Cary Street,	269		78	
Exeter,	40	2	58	20
Edinburgh,	163	13	115	12.4
Clifton Disp.	13		130	
Clifton,	12		264	
Blane, private,	39	10	191	4
Nottingham,	102		96	
Berlin,	79		122	
Dublin Disp.	1024		17	

TABLE XXI.—Scrofula.

Place and Period.	Sick.	Deaths.	Relative	
			freq. 1 to	mort. 1 to
	77 *m*	4 *m*		
	94 *f*	3 *f*		
Recent Plymouth	171	7	69	24
Ply. 1799–1805,	72	9	61	8
Willan, London,	83	11	34	7.5
Cary Street,	376		55	
Edinburgh,	73	16	257	4.6
Exeter,	39		60	
Clifton Disp.	53	2	32	26
Clifton,	16	3	191	5
Dublin Disp.	57		302	
O'Brien do.	45		228	
Norwich,	22		28	
Liverpool,	182		66	
Berlin,	62		158	
Army,	8	1	448	
Nottingham,	259		38	
Blane,	182	4	42	45
Do. private,	137	4	27	34
Plymouth N. H.	4		496	

TABLE XXII.—Synochus and Typhus.

Place and Period.	Sick.	Deaths.	Relative	
			freq. 1 to	mort. 1 to
Plymouth, Author's and Disp. patients recent,	226 *m* 314 *f*	13 *m* 11 *f*		
	540	24	21	22
Plymouth poor-house, recent,	98 *m* 210 *f*	3 4		
	308	7	9	44
Ply. 1799–1805,	487	56	9	8.7
Huxham,	88		8.4	
Willan, London,	132	18	21	7.3
Cary Street,	1001		20	
Willan, hectic,	48	14		3.4
Edinburgh,	323	14	58	23
Exeter,	670	27	3.5	25
Clifton Disp.	64	4	27	16
Clifton,	461	11	9	42
Manchester, 1796	364	40		9
Blane,	760	94	10	8
Do. private,	267	38	14	7
Plymouth, N. H.	547	89	4	6
Nottingham,	941		10	
Dublin, 1817-19,	39598	1857		21
O'Brien, 1819,	1816		5	
Dublin Disp.	912		18	
Liverpool, 1805,	830		14	
Do. Infir. 1793-97	530	51		10
Jamaica,	494	200		2.4
India,	3429	328	1.6	16
Berlin, 1805,	1958		5	
Army Ports. Hospital. 1809,	835	107	2.5	8
Do. Regiment,	663	32	5	21
Arracan,	1921	290	1.4	6.6
Seringapatam,	1508	38	2	40
Dr D. Monro, 1779,	800	38		21
Glasgow Infirmary, 1827,				7 *m* 10 *f*
Strabane, Dr Rogan, 1817, 1818,	2535 756	209 22		28
Dub. 1804–1812,				12
1812–1814,				15
1815,				20
Cork, in 15 years,				30·2
Carlisle Dispensary, 1817–18,	457	46		10
Edinburgh Infirmary & Queensberry Hospital,	1089	55		20
Gibraltar, 1828,	6570	1658		4

TABLE XXIII.—Variola and Varicella.

Place and Period.	Sick.	Deaths.	Relative	
			freq. 1 to	mort. 1 to
	97 *m*	16 *m*		
	83 *f*	9 *f*		
Recent Plymouth	180	25	63	7
Ply. 1799–1805,	112	46	40	2.4
Huxham,	126		6	
Willan, London,	40	4	71	10
Cary Street,	214		97	
Edinburgh,	165	45	116	3.6
Exeter (with Measles,)	38	1	61	
Nottingham,	533		18	
Clifton Disp.	2	1		
Clifton,	7	1		
Blane,	44	15		3
Do. private,	15	3	254	5
Berlin,	2		4850	
Dublin Disp.	114		151	
O'Brien, do.	16		706	
Carlisle, 1818,	46	7		7
Vaccine rep. 1829				3
Monro, Army, 1778,				5
Heberden, 1801,				6

TABLE XXIV.—Disorders of Brain and Nerves combined.

Place and Period.	Sick.	Deaths.	Relative	
			freq. 1 to	mort. 1 to
	473 *m*	41 *m*		
	929 *f*	36 *f*		
Recent Plymouth	1402	77	8	18.2
Ply. 1799–1805,	221	18	20	12
Huxham,	20		36	
Willan, London,	199	5	14	39
Cary Street,	1326		16	
Edinburgh,	153	91	120	17
Exeter,	16		147	
Nottingham,	446		22	
Clifton, Disp.	191	17	9	11
Clifton,	263	12	12	22
Blane,	498	55	15	9
Do. private,	234	41	11	6
Plymo. N. Hosp.	140	6	14	23
Liverpool,	807		15	
Glasgow Infir.	50		18	
O'Brien,	181		57	
Dublin Dispen.	1545		11	
Army regimental	8	6		1.3
Berlin,	1118		9	
Norwich,	39		17	

TABLE XXV.—Thoracic Organs and Air Passages.

Place and Period.	Sick.	Deaths.	Relative	
			freq. 1 to	mort. 1 to
Plymouth, Author's and Disp. pat., recent,	833 *m* 996 *f* 1829	93 *m* 93 *f* 186		9.8
Plymouth poor-house, recent,	199 *m* 319 *f* 518	27 *m* 21 *f* 48		10.8
Plymouth, combined, recent,	1032 *m* 1315 *f* 2347	120 *m* 114 *f* 234	5	10
Ply. 1799–1805.	815	123	5.4	6.6
Huxham,	180		4	
Willan, London,	590	47	5	12.5
Cary Street,	5950		3.5	
Edinburgh,	2696	211	7	12
Exeter,*	724	38	3	19
Nottingham,	1414		7	
Clifton Disp.	376	37	4.3	10
Clifton,	1011	53	3	19
Blane,	1024	196	7	6
Do. private,	694	125	5.6	5
N. Hosp. Plym.	666	206	3	3.2
Norwich,	117		5.2	
Berlin,	1280		7.6	
India, army,	104	11	58	9
Army H. Portsm.	92	20	21	4.6
Do Regimental,	754	30	5	25
Dublin Disp.	5058		3.4	
Do. O'Brien,	2622		4	
Nicol, India,	69	5	42	14
Devonport Dispensary,	188 *m* 223 *f* 411 †	21 *m* 16 *f* 37	5.7	11
Liverpool,	1493		8	
Glasg. Infirmary,	131		7	

* Including chronic stomach complaints.

† Total sick of all diseases, 2385.

TABLE XXVI.—Liver, Spleen, and Pancreas.

Place and Period.	Sick.	Deaths.	Relative	
			freq. 1 to	mort. 1 to
Recent Plymo. *	58 *m* 165 *f* 223	6 *m* 3 *f* 9	50	25

* In other registers the articles of this table are included under *hepatitis* and *icterus.*

TABLE XXVII.—Cullen's Phlegmasiæ combined.

Place and Period.	Sick.	Deaths.	Relative	
			freq. 1 to	mort. 1 to
Recent Plymouth	1437 *m* 1947 *f* 3384	107 *m* 93 *f* 200	3.3	16.9
O'Brien, Dublin,	2163		5	
Cary Street,	5492		3.6	
Ply. 1799–1805,	711	30	6	29

TABLE XXVIII.—Mouth, Fauces, Stomach.

Place and Period.	Sick.	Deaths.	Relative	
			freq. 1 to	mort. 1 to
Plymouth, Author's and Disp. pat., recent,	352 *m* 900 *f* 1252	12 *m* 11 *f* 23		
Plymouth poor-house, recent,	23 *m* 46 *f* 69	 1 *f* 1		
Plymouth, combined, recent,	375 *m* 946 *f* 1321	12 *m* 12 *f* 24	9	55
Ply. 1799–1805.	405	1	11	405
Huxham,	95		8	
Willan, London,	394	1	7	
Cary Street,	3244		6	
Nottingham,	969		10	
Clifton Disp.	56		30	
Clifton,	302	4	10	75
Plymouth N. H.	26	1	80	
Do. Debility,	107	14	19	7
Blane,	545	7	13	76
Do. private,	409	6	9	68
Berlin,	476		20.3	
Glasgow,	38		25	
Dublin Dispen.	1659		10	
O'Brien do.	788		13	
Norwich,	138		4.4	

TABLE XXIX.—Intestines and Peritonæum.

Place and Period.	Sick.	Deaths.	Relative	
			freq. 1 to	mort. 1 to
Plymouth, Author's and Disp pat., recent,	614 *m* 877 *f* 1491	46 *m* 51 *f* 97		
Plymouth poor-house, recent,	166 *m* 236 *f* 402	9 *m* 5 *f* 14		
Plymouth, combined, recent.	780 *m* 1113 *f* 1893	55 *m* 56 *f* 111	6	17

Ply. 1799–1805,	511	31	9	17
Willan, London,	371	13	8	29
Cary Street,	2483		8	
Edinburgh,	666	61	28	11
Exeter,	556	19	4	29
Nottingham,	278		36	
Clifton Disp.	275	17	6	16
Clifton,	390	11	7	36
Blane,	342	69	9	12
Do. private,	489	37	8	13
Do. without Ascites,	449	26		17
Plymouth N. H. without Ascites,	155	31	13	5
Berlin,	271		36	
Glasgow,	16		66	
Liverpool,	1422		8.6	
Dublin Dispen.	2136		8	
O'Brien do.	1431		7	
Norwich,	34		18	
India,	1093	69	5	16
Army H. Portsm.	1053	252	2	4
Do. Regimental,	191	10	18	19
Devonport, with stomach complaints,	124 *m* 313 *f* 437	10 *m* 5 *f* 15	5.5	29

TABLE XXX.—Urinary organs.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
Recent Plymouth,	91 *m* 109 *f* 200	6 *m* 3 *f* 9	57	22
Woolcombe,	47	4	92	12
Willan,	50	1	57	
Cary Street,	322		64	
Edinburgh,	3	3		1
Nottingham,	176		56	
Clifton Disp.	25		67	
Clifton,	7	1		
Blane,	147	9	52	16
Plym. N. Hosp.	12		182	
Berlin,	26		370	
Glasgow,	13		72	
Liverpool,	225		54	
O'Brien, Dublin,	42		246	
Norwich,	19		32	

TABLE XXXI.—Female, Sexual.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative mort. 1 to
Recent Plym.	356 *f*	7 *f*		
Ply. poor-house,	73 *f*	3 *f*		
Combined Ply.	429	10	26	42
Ply. 1790–1805,	286	13	16	22
Willan, London,	172	2	17	86
Cary St.	740		28	
Nottingham,	560		17	
Clifton Disp.	139	5	13	28
Clifton,	140		22	
Blane,	587	26		23
Do. private,	331	7	11	47
Dublin Disp.	781		22	
O'Brien, Dublin,	455		22	
Liverpool,	423		29	

TABLE XXXII.—Skin—without Fever.

Place and Period.	Sick.	Deaths.	Relative freq. 1 to	Relative 'mort. 1 to
Ply. Author's and Disp. pat. recent,	253 *m* 303 *f*	1 *f*		
Ply. poor-house, recent,	140 *m* 261 *f*	1 *f*		
Plym. combined, recent,	393 *m* 564 *f* 957	2	12	478
Ply. 1799–1805,	187	1	23	187
Berlin,	2798		3	
Willan, London,	236	1	12	
Cary Street,	1502		14	
Army. regiment.	302		10	
Nottingham,	451		21	
Clifton Disp.	49	1	35	
Clifton,	6			
Blane,	353	3	21	117
O'Brien,	455		23	
India,	5		577	

Comments on the Tables.

1. *Anasarca and Ascites.*—The relative mortality of dropsy seems to have been higher in London than at Plymouth at the close of the last century, probably as it was more commonly the result of the abuse of spirits and of depraved habits there than here. The greater relative mortality here now than in London then, I refer to the better treatment of inflammatory diseases now

allowing of the crisis by dropsical effusions only in very broken constitutions. Its greater prevalency here than at Edinburgh I take to be a mark of the enfeebling influence of our humid and breezy, yet mild climate. Its singularly greater prevalency, but with far smaller mortality at Exeter, if this be established on more extended observation, deserves to be carefully considered. Probably the more serious cases are attracted to the Hospital there by the sanative skill of the illustrious Blackall. It is singularly rare at the Nottingham hospital and at Edinburgh; less prevalent but rather more mortal at Clifton than here. Its enormous frequency at Dublin is a sad token of the impoverishment of the lower classes there. Its very high mortality in the London hospital, and in the naval hospital here, shows that a large proportion must have arisen from diseased organs. Dropsy seems not to be so common in naval and military as in civil hospital practice, which evinces the healthful influence of that mode of life, or the efficiency of early resort to medicine. But in comparing the registers of the public and civil department, allowance must be made for the circumstance, that all the subjects of the former are originally adults of vigorous constitutions. A hot climate seems to have a benign influence on its mortality.

2. *Asthma—Dyspnœa—Hydrothorax.*—This section comprises all the chronic maladies of the lungs which are not in a state of ulceration or of active inflammation. Their greater mortality now at Plymouth than twenty-five years ago is apparent only and not real; for Dr Woolcombe placed many of his deaths under phthisis. The disparity between the ratios for Plymouth and that assigned by Willan also arises from a difference of designation.

3. *Apoplexy—Palsy.*—Is not the singular infrequency of these diseases at Edinburgh a testimony to the sober habits of the Scottish populace?* But I fear this remark will not apply to Dublin. They are singularly prevalent at the Liverpool Dispensary; far more so in London than here thirty years ago, as might be expected from the different habits of the metropolis and a country town. They are on the increase here, but declining at Clifton. Their high mortality with Chisholm, as also at Edinburgh, and in a more awful proportion among the higher classes in London, deserves attention.

4. *Carditis and Organic diseases of the Heart* are singularly infrequent at Edinburgh, although in Dr Alison's reports for 1816–19 they are prevalent; but the high mortality is, I think, an evidence that many cases were overlooked at the New Town Dispensary.* They are vastly on the increase here of

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* We are unfortunately not in possession of numerical data to oppose to the re-

late, but are decreasing at Clifton. They have certainly not been well discerned by Woolcombe, nor by Clarke at Nottingham. They are common among Irishmen; rare among seamen.

5. *Cynanche* is greatly reduced in frequency since Huxham's day; probably as, from the marshy parts of the neighbourhood being now more cultivated and inhabited, the formation of atmospheric miasms is prevented. *Cynanche laryngea* is still common here; less prevalent here than in London, but more so than at Exeter, except the species *croup,* which is also very prevalent at Edinburgh.

6. *Convulsions, Epilepsy, Chorea, Tetanus.*—Many cases which might be arranged here are comprised in some registers under the term acute infantile, and hydrocephalus acutus. They are singularly rare at Edinburgh, where, according to the author's recollection, it was very prevalent in 1819–22. It should seem that Plymouth is very obnoxious to this malady, where certainly the infantile mortality is high. All the Edinburgh cases were in the young; hence the high mortality.

7. *Bronchitis, Catarrh, Pneumonia.*—This table exhibits all the acute and recent inflammatory pulmonic affections. The large amount in the section '*Recent Plymouth*' is partly from my placing here some cases which others have arranged under dyspnœa.—These diseases are singularly more frequent here than at Liverpool. The section "Arracan" shows the vast influence of a hot climate in depressing them; and the "army regimental" makes me suppose, that when bowel complaints and fevers are prevalent this class is low in frequency. They are rather prevalent among seamen. Dr Risk, the able surgeon of the flag ship here, has favoured me with a register of the diseases treated by him on board H. M. S. Britannia, from May 1827 to May 1828. His list contains 180 cases of catarrh with pneumonia, among whom no death is recorded; but fifteen are described as sent to the country,—on which Dr Risk remarks, "these were generally from ships on foreign stations, worn out with years and infirmities, and on their arrival here were invalided out of the service." A singular remark of Dr Wells in 1811 occurs in the Medical and Chirurgical Transactions, Vol. iii. that "a physician here (London) may pass several years without seeing a single legitimate instance of pleurisy. Among the patients of the Finsbury Dispensary, I never saw one requiring the loss of half the quantity of blood that Sydenham says is necessary for that disease—forty ounces." This is

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sults here deduced from the tables of the New Town Dispensary. But we are quite certain from our experience in the Infirmary, that both of these sections of diseases, and especially that including diseases of the heart, are far more common than the ratio assigned in the table would indicate.—[EDITORS.]

a strong proof that the type of diseases in general has been changed of late years.

The disparity between Willan's and Woolcombe's mortality I cannot explain; but I have reason for inferring that pulmonic disorders are very fatal here. The vast difference in the mortality among the "army regimental" sick, and in the naval hospitals, is explained by the desperate or protracted cases chiefly being sent into the latter institutions. The high mortality in India shows that the circumstance which depresses the frequency of the disease augments the chance of death. Dr Howell's fatal cases were chiefly in children; hence the disparity between his results and those of Chisholm's in the same institution eight years before.

8. *Cholera*, *Diarrhœa*, *Melæna*.—May the rapid and extreme changes of temperature, with the vast quantity of rain on a shallow limestone soil, explain the high mortality, as well as the great frequency of this class here, and can the quantity of cyder consumed at Exeter be the cause there? Dr Barham is correct in his "suspicion that cholera is unusually prevalent in this place in its season, and at the same time severe in its character." It is very remarkable, that when cholera was so extensively epidemic at Seringapatam, the mortality should have been so low. Why is it so rare at Nottingham?

9. *Dyspepsia*, *Asthenia*, *Hypochondriasis*.—Willan's ratio is a strong reflection on the habits of London life. The disparity between Chisholm's and Howell's proportion is a striking instance of peculiar diagnosis. "His mind," says Dr Howell, "was tinctured with hepatic affections." The ratio at Nottingham shows well the influence of sedentary manufactures on the stomach.

Dr Barham remarks, in a letter to the author,—"At Penzance a complaint which attracted my notice as much as any, was difficulty or incapability of swallowing, arising from stricture in the œsophagus, generally at the cardiac extremity. More than a dozen cases of this kind came under my notice; and several of them I watched till their fatal termination by inanition. In one that I examined after death, I found the cardiac orifice just large enough to pass a quill, slightly thickened, but without ulceration. That complaint certainly appeared to me more than usually abundant in that neighbourhood; and I used sometimes to speculate on the possibility of a potato diet being the cause. I have not been able to learn whether it particularly prevails in Ireland."

10. *Dysentery*, *Enteritis*, *Peritonitis*.—Their infrequency here formerly seems unaccountable. The apparently large proportion now is probably owing to our adoption of some of

Broussais's views of disease, and to my *enteritis erythematica* including cases of the infantile remittent fever of other writers, which also explains my high mortality. They are the pest of Indian armies. The disparity in Edinburgh and Dublin is remarkable. In dysentery at the Glasgow Infirmary 1827, the relative mortality in the male was one to eight, in the female one to ten. What possible variety of circumstance can account for the difference in its mortality in Willan's table and at Edinburgh?

11. *Erysipelas.*—Although declined in its frequency here since Huxham's days, there is a curious increase since Woolcombe's time. Its high relative mortality at Edinburgh shows how strong a disposition occasionally subsists to affect some vital organ. The habits of high life vastly contribute to excite this malady.

12. *Gastritis*, *Hæmatemesis.*—Formerly these seem to have been of rare occurrence here. Their recent predominance may be ascribed to a peculiarity in diagnosis, and to many cases of acute infantile disorders being referred to these titles, which with other writers have a different position. It is marvellously rare at Nottingham, where disordered function of the stomach is nevertheless so very prevalent. The more exquisite cases alone can be noticed in the Edinburgh register, from the amount of its mortality. Affluence and voluptuousness seem vastly to affect the fatal result of this class.

13. *Infantile Remittent Fever.*—The same sort of cases surely cannot be comprised in the Plymouth, in Willan's, and in Howell's registers, when the relative mortality is so greatly unequal.

14. *Hepatitis*, *Icterus.*—These are common diseases in the London hospitals and in high life. From Nicoll'sregister,it seems that the same circumstances favour the rise of liver complaints as of cholera. They are evidently prevalent at Clifton, although Chisholm's enormous rate was the consequence of his *hepatic vision.* They are common in the navy, not frequent at Edinburgh. The high rate here now is referrible to the habits of our females, which create, however, the milder form of the disease, as is evinced by my small relative mortality, compared with that of Edinburgh. Nicoll contrasted with the Portsmouth "army regimental," shows the great influence of a hot climate on the fatality of these disorders. The cause of the high mortality at Edinburgh deserves inquiry.

15. *Phthisis* and *Hæmoptoe* are highly frequent in Woolcombe's enumeration, from his arranging here cases which Willan has placed under cough and dyspnœa. Dr Howell's rate is small, from his only terming those cases phthisis which had

a fatal issue. In this he differs from other observers. It is very common at Nottingham, from the sedentary nature of the occupation of the manufacturers.—It is curious that it is so much more frequent in the navy than in the army. How is it so prodigiously prevalent at Norwich and Berlin? Its relative mortality is low here, as many cases wear the aspect of phthisis which are not truly such, but originate in asthenic inflammation of the pulmonary mucous membrane, without tubercles or ulceration.

16. *Phrenitis, Hydrocephalus.*—Many mild cases are placed in the Plymouth proportion, which other physicians term "acute infantile." It is certainly a common malady at Edinburgh and Clifton. Its high relative mortality, which is confirmed by so many observers, forbids any sanguine hope of recovery in cases which assume the genuine aspect of this malady.

17. *Pertussis* is reduced in frequency here since Huxham's days; but still I believe Plymouth to be very obnoxious to this disorder. It is rare at Clifton; and certainly it has fallen in relative mortality of late years.

18. *Rheumatism, Gout.*—There is a curious equality in the prevalence of these diseases now and twenty years ago; and their relative mortality has also undergone little change, but has probably rather declined. They are unexpectedly prevalent at Seringapatam. Its high relative mortality in the naval hospital and in Blane's practice may serve to show how often it attacks internal organs.

19. *Measles* is certainly reduced here since Huxham's time; although on the increase of late years. Does its prevalency at Edinburgh and Clifton show that elevated windy situations favour the rise of measles? It is manifestly high in fatality at Plymouth. Can any variety in medical treatment solve the disparity in its mortality with Howell and Chisholm? or does not this show that the measles have at times a malignant constitution?

20. *Scarlatina* has certainly been declining of late in frequency and relative mortality. Blane's enormous mortality is probably from the circumstance of a London physician being called only to the more severe cases. The disparity in relative mortality between Willan and Woolcombe, about the same period and in similar institutions during several years, shows how unfair it is to form a comparative estimate of the virtues of medical practice from such statistics.

21. *Scrofula*—The apparently low rate at Edinburgh and with Howell is owing to the omission of the mild external scrofula. It is frequent among the higher classes in London. Its high rate at Norwich and Nottingham is accordant with the

prevalency of phthisis there. London I believe far surpasses all other places in the relative mortality of scrofula, although some of the tables exhibit a larger ratio.

22. *Synochus* and *Typhus* have declined here in frequency of late years; for they were vastly prevalent in Huxham's days. The Plymouth poor-house list contains many infantile remittent cases. Clifton and Exeter seem to be enormously subject to fever; but I suspect that the numbers do not consist entirely of proper fever cases. At times it is very prevalent in the naval hospitals. Fever is the pest of India, where it occasionally constitutes two-thirds of all coincident maladies. The "Army Regimental" list at Portsmouth indicates the dire catastrophe which befel our troops in the retreat from Spain. It has certainly fallen in relative mortality here of late years. There is a singular disparity in mortality in the regimental practice at Seringapatam, and in the hospital at Arracan during the late Burmese war. There is on the other hand a curious coincidence in the relative mortality in Arracan and at the Plymouth naval hospital; yet the proportion of deaths in the regiments at Portsmouth in 1809 was much higher than in the regiments at Seringapatam. Dr Monro's were cases of low autumnal fever, both in regiments and hospitals, which is for the most part a deadly variety.

In Cork during fifteen years, we are told in this Journal for 1818, the highest relative mortality was one in 26, the lowest one in 48;—in Dublin during twelve years, the highest one in 16, the lowest one in 20;—on Lord Abercorn's estates, the highest one in 12, lowest one in 34. In the late yellow fever at Gibraltar, the relative mortality in soldiers was one in 3.41; and in others one in 4.15. At the Liverpool Dispensary from 1780 to 1796 a fourth of the whole sick had typhus. "March," says Currie, "takes the lead in the prevalence of fever, and August the rear;" so also with inflammatory affections generally. The spring and autumn I find to have been most pregnant with fever during that whole period. Dr Carlyon of Truro, who has devoted much attention to fever in Cornwall, has favoured me with some interesting remarks, which may form an agreeable episode in these statistical details:—"Fever uncombined with primary local inflammation is of frequent occurrence before puberty. The cases are innumerable where it has occurred to me to relieve children by a single dose of aperient medicine, with a proper regulation of diet and temperature, particularly the temperature of the body by tepid ablution. Even where I have not seen the patient until the fever has been established, there has seldom been a necessity for more active measures than such as may be comprised under the continued use of diluents, and regulation of the bowels, and temperature of person and apartment. In the exhibition of aperients I have found it far better to give calomel and rhubarb every other night, than perpetually to solicit alvine dejections. Soothing throughout, and keeping up the strength towards the end, is the grand secret nine times out of ten. Consequently it is fair to presume that nine times out of ten there has been no primary local inflammation. Where the case has been combined with local inflammation, the use of leeches has had the effect of putting a stop to the fever, or of resolving it into the uncombined state. What may properly be called the epidemic fever of Cornwall, is a low remittent typhus, requiring attention to the bowels, and greatly under the control of cinchona. We have likewise had a great deal to do during the last twenty years with contagious typhus, which corresponds with the same disease in other parts of the island."

23. *Variola* and *Varicella.*—In Huxham's day variola formed at least a sixth of all prevailing maladies, and now not one-sixtieth. It is still lamentably more prevalent here than in London or Edinburgh. Is its great rarity at Clifton from the better use of vaccination there? Its rarity at Berlin only seven years after the discovery of the immortal Jenner is truly memorable. If we judge from Plymouth alone, it is fallen in relative mortality of late years. The disparity in the proportion of deaths between Willan and Woolcombe is remarkable; nor can this be resolved into a greater portion of the higher classes having composed a part of Willan's aggregate, since the deaths in Blane's practice were so high as one in five. Dr Gregory's ratios at the small-pox hospital, however, oppose my inference; and the annual vaccine report states that one of three now dies of this malady, when taken in the natural way. With Dr D. Monro, in the army at Coxheath, one in three died from confluent small pox, and in the regimental hospital four of seven died.

In 1779, of twenty-four with the distinct kind none died; of forty-nine confluent eleven died; and of three others with petechiæ all died. As this disease is so much more fatal in the adult, it is a merciful law of Providence that the young should be its chief subjects. Dr Watt was of opinion, that, were the small-pox to prevail so generally now as they did thirty years ago, the proportion of deaths would be still greater than it was then, from the progressive enfeebling of the lower classes by their employment in manufactures and unhealthy public works. My ratio of the recent relative mortality certainly is in opposition to this gloomy inference.

24. *Disorders of the Brain and Nerves.*—This class con-

sists of phrenitis hydrocephalica, hydrencephalus, encephalitis, organic diseases, convulsio, hysteria, neuralgia, epilepsia, chorea, tetanus, apoplexia, paralysis, vertigo, and cephalæa.

The smaller frequency but higher relative mortality in the male sex deserves remark. They are singularly more prevalent here of late years. Probably at Edinburgh the milder cases are omitted. Clifton is certainly prolific in this class. Its relative mortality in the army is very high, from the soldier's habits. The dissipation of high life has a similar influence. Willan's relative mortality is low, as many cases of convulsio are included by him in acute infantile fever. A curious disparity will be remarked in Howell's and Chisholm's relative mortality.

25. *Diseases of the Thoracic Organs and Air Passages.*—This class is exclusive of pertussis. The London and Clifton poor seem to be peculiarly subject to diseases of the lungs. These are also on the increase at those places and at Plymouth. They are at least eight times more prevalent in Great Britain than in India. These sections oppose the inference of Dr Wells, that low marshy situations are not pregnant with pulmonic affections.

The great prevalency of pulmonary disease among the poor of this part of Devonshire does not absolutely oppose the popular opinion on the expediency of resort here for such of the consumptive as have the means of counteracting our humid climate. Can Drs Willan and Howell have ascertained all their fatal cases? Is the enormous mortality of Blane's private practice to be referred to the habits of high life, or to the circumstance that a London physician sees mostly the severe cases? The army and navy hospitals receive only select bad cases, hence their high mortality; but that Woolcombe's dispensary practice should so nearly approach the rate of the former is very remarkable.

27. The *Phlegmasiæ* have certainly assumed a more inflammatory type since the beginning of this century.

28. *Diseases of the Mouth, Fauces, and Stomach.*—Their infrequency in the navy shows the wholesome influence of exercise, sea-air, and a mind at ease on the stomach. Nottingham is prolific in this class, in connexion with female complaints, compared with Hull. The liver and stomach appear from the Clifton ratios to be rivals who can never reign together in a medical register. The Plymouth amount is large from the cases of infantile remittent which are placed here. This also explains my ratio of mortality. The relative mortality is shown on this large scale to be three times higher in the male than in the female.

29. *Diseases of the Intestines and Peritonæum.*—The Devonshire cyder and the rain are seen still to be productive of disordered bowels, though not in the form of colic. Clifton and Plymouth accord in many points of obnoxiousness to particular maladies. It is curious that the proportion in relative mortality is the same here at an interval of twenty-five years. These diseases are only a little more mortal in India than at Plymouth; but in the former section we have merely cases in the adult and robust;—in the latter all ages, and the infirm from birth are included. They are stated to be three times more mortal in the English army from Spain than in India at Arracan and Seringapatam. These sections contain many proofs that the circumstances which make a disease prevalent do not tend to augment its mortality in a similar ratio.

30. *Diseases of the Urinary Organs.*—Are there any physical circumstances in which Norwich, Nottingham, and Liverpool agree, that these places should be so prolific in urinary disorders?

31. *Diseases of the Female Sexual Organs* are vastly affected by the voluptuousness of the higher classes. The disparity in Woolcombe's and Willan's is only referrible to those inappreciable chances which more or less affect every man's experience.

32. *Diseases of the Skin without Fever.*—Poverty is vastly productive of these affections. Is not a warm climate shown here to be the best *dernier resort?* It would be a great charity to send to the common people at Berlin a German version of the "*Cottagers of Glenburnie*," for such predominance of the *itch* there is only to be ascribed to filthy habits.

The disorders of the thoracic organs are here seen to take the lead in relative mortality; and fever to be of late years lower in this attribute than inflammatory disorders generally. Measles are less mortal than hooping cough; and those affections which are attended by discharges than other maladies of the same organs. The chronic affections of the lungs, exclusive of proper consumption, are nearly twofold higher in mortality than the acute diseases. The large proportion of agues here in Huxham's day being a twenty-third of all diseases, and their present rarity, are truly memorable.

(To be continued.)

ART. IX.—*On a new mode of employing the Nitrate of Silver as a test for Arsenic.* By PATRICK FORBES, D. D., Professor of Chemistry, King's College, Aberdeen.

SIR,

I BEG leave, through the medium of your Journal, to communicate a mode of applying nitrate of silver as a test for discovering the presence of arsenious acid (white arsenic) in any liquor, which is not liable to the objections that have been urged heretofore against the employment of this reagent.

In all cases, I suspect, where arsenious acid is mixed with the contents of the stomach, it will be found that muriatic acid, either free or in some of its combinations, is also present. If I am right in this opinion, then the application of nitrate of silver as a test in the common way will be found perfectly useless. For, if either the arsenious acid has been combined with an alkali previous to the application of the nitrate of silver, or an alkali is employed in conjunction with that test, the arsenite of silver will be precipitated along with the chloride of silver, and it will be impossible to say with any certainty, whether arsenite of silver be absolutely present or not. The only resource which remains is to mix the whole with black flux, and to detect the arsenic by sublimation.* The use of the nitrate of silver as a reagent is consequently quite lost.

Another objection to the use of nitrate of silver as a test for arsenious acid, and I think a more serious one than it has generally been accounted, is, that the alkaline phosphates give a precipitate very much approaching in colour at least to arsenite of silver when precipitated.† Some directions have been given by writers to enable the operator to distinguish between them. But these I hold to be barely sufficient to enable one who is not an experienced chemist to give his oath in a court of justice. This is so awful a situation for a man to be placed in, where the life or death of his fellow-creature depends on the accuracy of the results obtained, that no one ought to give evidence where the slightest doubt remains on his mind.

The following mode of procedure avoids all the sources of ambiguity arising from the presence of muriatic acid or any of its combinations, or of the alkaline phosphates—and it is so simple, that any person, at all capable of performing chemical experiments, may conduct it in a satisfactory manner.

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* This statement requires some restriction. The usual remedy is to dissolve out the arsenite from the precipitate by means of a few drops of nitric acid, to filter and to neutralize the clear fluid with ammonia. The yellow arsenite is thus thrown down again, and apart from the chloride. Dr Forbes's method, however, is much superior, both because it is more elegant, and likewise because by the other mode the arsenite if small in quantity is subject to be retained in solution by the nitrate of ammonia formed in the course of the process of separation.—[EDITORS.]

† There is here also a slight inaccuracy. If the alkali used in preparing the silver test by the old method is ammonia, the test does not affect solutions of the alkaline phosphates at all unless they are considerably concentrated.—[EDITORS.]

1. The suspected liquid must be carefully filtered, and if very viscid, may be diluted with *warm* distilled water. If after filtration it has colour, it should be diluted with distilled water till the colour has *just* disappeared. A solution of nitrate of silver (which precipitates free muriatic acid and all its combinations, decomposes all the alkaline phosphates, and precipitates the phosphoric acid in combination with the silver, but has no effect by simple affinity on arsenious acid) is then to be dropped into it till all precipitation ceases. The liquor must again be filtered, and solution of nitrate of silver added, when no precipitate will appear if sufficiency of nitrate of silver has been formerly used. If any precipitate do appear, an *excess* of nitrate of silver must be added and the liquor again filtered. Take now a small glass rod and dip the point of it in a solution of pure ammonia, and just touch the surface of the liquor with it; in a few minutes, if any arsenious acid be present, abundance of the well marked yellow precipitate of arsenite of silver will diffuse itself down through the liquor.

2. Great care must be taken to add very little of the pure ammonia. The reason is, that the pure ammonia in excess has the power of dissolving the arsenite of silver. This property of ammonia affords therefore a second decisive test. For, after the precipitate has been fully formed, it is only necessary to add ammonia in excess, when, if the precipitate be arsenite of silver, it will on stirring be perfectly dissolved, and the liquor will appear colourless as before.

3. By adding nitric acid to this colourless liquid till the ammonia is neutralized, the precipitate of the arsenite of silver may be again made to appear—which affords a third proof of the nature of the precipitate.

4. The precipitate may now be collected, mixed with black flux, (both being made quite dry) put into a glass tube, and the arsenic sublimed and condensed in its metallic state.

It will be observed that I have not directed the contents of the stomach to be boiled before the test is applied. The reason of this is, that it is wished to prevent the union of the arsenious acid with any free alkali which may happen to be accidentally present which would prevent the success of this process. The application of *warm* distilled water on the contents of the stomach in the filter will, however, be found sufficient to carry along with it all the arsenious acid, and will not in any way interfere with the future steps of the analysis.

The use of nitrate of silver employed in the above manner in the detection of arsenious acid recommends itself by its simplicity, and by the ease with which the substances employed may at all times be procured. But it by no means supersedes the employment of sulphuretted hydrogen, which also affords excellent indications of the presence of this poison. Every liquor supposed to contain arsenious acid should be subjected to both these reagents; and if both these tests exhibit the appearances which ought to follow their use if arsenic be present, there cannot remain the smallest doubt on the mind of the analyst, and he will be enabled to give his testimony with the most unhesitating confidence.

If any one wishes to satisfy himself of the acccuracy of the method now detailed, he has only to make a mixture of any muriates, alkaline phosphates, solution of arsenious acid, decoction of onions, coffee, &c. and to proceed as above directed.

It deserves attention that the precipitate must be guarded from the *direct rays* of the sun, which will immediately turn it black from the presence of nitrate of silver and vegetable matter.—I remain, Sir, your obedient servant, &c.

King's College, Aberdeen, June 15, 1829.

ART. X.—*On the use of Quinine in the Ague of Dublin, and its power in accelerating mercurial action.* By WILLIAM HARTY, M. D. Member of the King's and Queen's College, &c. &c.

SIR,

BEING desirous of drawing the attention of the profession as speedily and as generally as possible to a matter of some practical moment, I have been led with that view to trouble you with the subjoined statement of facts relative to the conjoint exhibition of mercury and of the sulphate of quinine, as furnishing strong presumptive evidence at least of the influence of the latter in promoting the rapid action of the former.

During the last two years intermittent fever having been, and still being, more than usually prevalent in this city and its northern vicinage, several cases both in private families and in public institutions came under my cognizance. In the spring of last year a few cases of ague having occurred among the female convicts in Richmond Bridewell, I administered to them the sulphate of quinine, directing at the same time the occasional use of the "house pill," consisting of calomel and scammony. Though I had seen sudden ptyalism excited by a few doses of these pills in a few of the female prisoners, I was yet much surprised at the rapidity and severity with which on this occasion almost all those were so assailed who were taking the quinine. As many females, however, are easily affected by the mildest preparations of mercury, I scarcely entertained a suspicion which then crossed my mind of the possible influence of the one medicine over the action of the other, until the male prisoners of Newgate furnished me with evidence less equivocal. Two of these having had previous attacks of ague suffered a relapse, and as the liver appeared in a morbid condition, I conjoined the blue pill with the sulphate of quinine, two grains of each to be taken thrice a-day. Salivation speedily ensued with both, the ague ceased, and I discontinued the pills. With one the disease never returned, with the other it reappeared after an interval of fifteen or sixteen days on the cessation of the ptyalism. The patient who had suffered severely from it, requested I would give him no more mercury,—a request with which I complied, and merely directed three grains of the sulphate every sixth hour. A few days afterwards he complained that I had deceived him, and in proof of it, exhibited his gums, which had again become sore and swelled. Though I at this time entertained a strong suspicion of the influence of quinine in promoting the mercurial action, I was not prepared to believe that after the action had apparently ceased, the quinine could re-excite it. I therefore made very particular inquiry of Mr Nicholls (the apothecary to our prisons) relative to the composition of the pills last ordered, and received such assurances as satisfied me that no error had been committed. I have met ten such cases from time to time, some of which I mentioned as they occurred to medical friends with the view of drawing their attention to occurrences of a similar character. Two of these I shall detail as more striking and conclusive than the foregoing. A boy between 4 and 5 years of age, previously very healthy, was seized with severe tertian. The tongue being foul and the belly full, I directed three grains of calomel, which purged him well and relieved him much. I then administered the quinine in solution, and in about six days I repeated the calomel with similar good effect, still continuing the quinine. The ague speedily ceased, but at the expence of the worst ptyalism with ulcerated and everted gums I had seen for a long time. He did not entirely recover from its effects at the end of six weeks.

A medical friend to whom I had communicated these facts, having been seized with quotidian, employed the bark liberally, and then the sulphate without any previous use of mercury, which he dreaded from the readiness with which it usually affected his gums. The quotidian accessions continuing, though with abated violence, and the feces appearing of a highly bilious character, he was induced to take five grains of Plummer's pill (containing one of calomel) with the intention of repeating it daily. In less than six hours after the first dose, he distinctly felt the mercurial action establishing itself in the gums, and could scarcely credit his feelings until the facts I have already detailed were recalled to his recollection.

I have troubled you with these details in the hope that the matter may thereby be soon brought to a more decisive test, and that the suggestions may be found of service in those numerous cases where it is often no less difficult than important speedily to establish the full and active influence of mercury.—I have the honour to be, Sir, your obedient servant,

Dublin, June 8, 1829. WILLIAM HARTY.

P. S.—If quinine be capable of promoting the action of mercury, it may naturally be asked, "Does not bark itself possess a similar property?" As the cases have been very numerous indeed (especially in hot climates) where bark and calomel have been freely administered together, has experience warranted any such conclusion? I have not leisure at present to examine the question.

ART. XI.—*Case of Intestinal Obstruction successfully treated by Mechanical Means.* By ALEXANDER RUSSEL DUGUID, M. D., Kirkwall.

ON the 10th December 1828, 3 o'clock P. M., I was called to visit J. H. a young man, about 20 years of age, who had suffered severely, since the afternoon of the 8th, from obstinate constipation, attended with occasional paroxysms of violent pain in the abdomen, generally ending in efforts to vomit. On the 9th he had taken 2 oz. of castor oil; and a common domestic enema had been administered; but the greater part of the oil had been vomited, and neither of these expedients produced the smallest discharge from the bowels, or any mitigation of his sufferings. He had also used the warm bath. Abdomen hard, and very much distended; pulse 100.

Emitr. Sanguis ad ℥xxiv. et habt. Haust. c. Tinct. Opii gutt. L.

In two hours the opiate began to have its due effect, and he experienced almost total cessation of the abdominal pain and retching. This appearing a favourable opportunity for the exhibition of a purgative, an ounce of castor oil was given every half hour, till four ounces were taken without being rejected; and I also threw up a strong enema of senna and salts. The latter having come away in half an hour without any trace of feculent matter, it was frequently repeated, but always with the same result. At nine P. M. he was again bled to 16 oz., and an emulsion containing two drops of croton oil was given every half hour. The greater part of this remained on the stomach, but at twelve P. M. no evacuation had taken place from the bowels, though repeated attempts had been made, and the immunity from suffering which the patient had enjoyed while under the influence of the opiate was now at an end, the paroxysms of pain having returned with aggravated violence.

Being twelve miles from home, and from the nearest supply, I was unavoidably confined to the chance which remained to my patient from mechanical means alone, since no new medicinal expedients could be resorted to. Dilatation of the rectum with warm water, thrown up by Weiss's powerful syringe, was next resorted to. As soon as about a pint and a-half were thrown up, he complained of much pain and distension, and it was returned with great force in spite of my efforts to prevent it, and without any trace of feculent matter. This was frequently repeated with the same result. I then introduced the elastic tube of Weiss's instrument, well oiled, about ten inches into the rectum, and finding an obstruction to its further passage, I fitted the syringe to its extremity and continued to exhaust the air for a minute or two; but this having no effect, I attempted to push the tube past the obstruction. After some difficulty, and repeated trials, I gained a few inches, when all at once, to my great satisfaction, the resistance was overcome, and a copious discharge of very fetid flatus, with some liquid feces, took place through the tube, with almost instant relief of the distension and pain of the belly. I then fitted the syringe to the extremity of the tube, and pumped out a large quantity of feculent matter of the appearance and consistence of yeast. When this was too solid to pass through the tube and syringe, so as to choke the instrument, a quantity of warm water was thrown in, and the pumping process resumed. In this way a great accumulation of feces was brought away, with total relief of all the symptoms. Upon withdrawing the tube, the cause of the obstruction, which indeed I had previously surmised, became very apparent, by the thin streaks of hardened feces with which the tube was coated on various parts of its surface, and which were confined to that portion of it which had passed the region, about ten inches from the anus, where the great difficulty of introduction had been experienced. An opiate enema was now administered, and I left my patient at eight A. M. of the 11th. A purgative mixture of senna and salts was sent him, which operated well, and left him convalescent.

Obstruction of the intestinal canal is a disease so serious in its nature, of so frequent occurrence, and often so unmanageable by the ordinary treatment of glysters and purgatives, that any available addition to the resources of our art, free from danger, and of easy application, cannot fail to be acceptable to the professional public. So far as I know, the expedient, the good effects of which in one instance I have detailed, has been hitherto untried, nor was I aware that it had ever been proposed, until long after the occurrence of the above case. At all events, it has no place, as applicable to desperate cases, in the systems of medicine which are generally put into the hands of young practitioners. Our principal reliance is placed on purgatives, mechanical dilatation with warm water, and tobacco in the form of smoke or infusion. When excessive vomiting, indicating the inversion of the peristaltic motion, and great swelling of the abdomen have taken place, many inconveniences attend the use of purgatives; for even when the difficulty of getting them retained on the stomach is surmounted, and their influence is duly exerted on the bowels, they seem to increase the distension by forcing down the contents of the upper intestines, and thus produce a state which is unfavourable for the action of the abdominal muscles in the expulsion of feces. On this account, the croton oil, the most powerful of them all, seems better adapted to cases where the costiveness is owing rather to torpor than to obstruction of the bowels. The application of the tobacco enema, though sometimes effectual, is also in some degree objectionable, because it is seldom had recourse to unless as a last resource; and when great prostration of strength has already taken place, its debilitating effects are confessedly not free from danger. If, then, a great proportion of cases of ileus be caused by a hardened ball of feces in the colon, at no great distance from the anus, perhaps at the sigmoid flexure, a different, or at least an additional expedient, when all others fail, ought to be employed. A hollow bougie of elastic gum, with its point conical and perforated on the sides, ought to be introduced into the rectum; and the seat of the obstruction having been thus ascertained, by cautiously applying additional force, it may be pushed through the offending substance, if merely hardened feces, and then the management of the case will become comparatively simple. It will be necessary, no doubt, in such an operation, to be cautious. It is possible that the point of the tube may become entangled in the coats of the intestine, and an obstacle to its farther progress may be thus produced; but the resilience of the instrument will sufficiently indicate the nature of the difficulty, and communicate a very different feeling from the resistance afforded by an inelastic substance such as hardened feces. Where the obstruction arises from calculus, no benefit is to be expected from the measure I have detailed; and even the natural contents of the intestines may become so indurated as to form an obstacle almost equally insurmountable, at least by an instrument of so soft and yielding a nature as can be safely employed for such a purpose;—but it may be presumed that such cases are comparatively rare, and that in general the cause of the disease may, with care and perseverance,—more especially if within the efficient reach of the tube,—be eventually overcome. Of the bad effects which might by possibility result from such a practice, I should wish to speak guardedly, my experience being much too limited. It is certainly easy to conceive that any violent and repeated efforts might produce injury to the mucous coat of the intestine—perhaps dangerous inflammation. But it is not probable that such accidents will occur in the hands of any experienced person; and that they are not peculiarly liable to happen, may be inferred from the freedom which is used with these parts, in introducing bougies for the dilatation of permanent stricture, in which cases, from the morbid irritability already existing, accidents might more naturally be expected to follow.

Several months ago, a similar case was detailed in the Medical and Physical Journal, occurring at Genoa, in which, after the failure of every other remedy, the disease was happily overcome by exhausting the air in the rectum, beneath the seat of the obstruction; but it may safely be affirmed, that in many instances so feeble an expedient would be altogether nugatory. It forms, however, the nearest approximation to the practice above described which has as yet occurred to me, and was unquestionably the hint which led me to the adoption of a bolder and more effectual measure.

Kirkwall, 10*th June* 1829.

ART. XII.—*On a New Mode of applying Galvanism without giving a Shock.* By K. T. KEMP, Esq.

GALVANIC electricity shortly after its discovery, and down to the present time, has been more or less used for medical purposes; and although the diseases for the cure of which it has been employed have been various in their nature, and affecting organs the most dissimilar in their structure and function, yet only one method has been adopted for its application, and that invariably accompanied with the repulsive sensation of a shock.

To persons of a nervous temperament the dread of the shock has proved an insuperable objection to its use; and it has also deterred practitioners from applying it, of a sufficient intensity, in cases where diseases affected the more delicate organs of the body, as the eye and ear. It is to obviate this that I have adopted the following mode of applying the galvanic energy, by which it may be made to pass through the body without inducing the sensation of a shock, and by which the quantity of electricity may be gradually and almost imperceptibly increased to any extent.

When a patient is subjected to the influence of galvanism in the ordinary way, he is made to form part of the circuit by means of one wire passing from each of the poles of the battery; or, if it is too powerful, from any number of the plates. If he is subjected to the influence of, say twenty plates, one of the wires, terminated by a brass ball, which he lays hold of, is placed permanently in the first cell of the trough. The other wire having also attached to it a ball, which he lays hold of with his other hand, is then put into the twentieth cell of the trough, and at this instant the patient experiences a shock. When the wire is removed from the cell, he experiences another. If a greater intensity of galvanism is required, the patient has to be subjected to a more severe shock, in proportion to the number of plates which are added. And these shocks are experienced both when the wire is inserted into the cells and removed from them, or, in other words, every time the circuit is completed and broken.

These inconveniences are entirely obviated by the very simple expedient of having *two* wires attached to one of the balls, by which the patient is made to form part of the galvanic circuit. Let us suppose a patient about to be subjected to galvanism by means of a common galvanic battery, that he is to receive it through the arms, across the chest, and that the circuit is to be formed by two brass balls, to one of which is attached a single wire, and to the other two distinct and separate wires. The trough being charged, the person takes hold of one of the balls, say that which has the single wire attached to it. The extremity of this wire is to be placed into the first cell of the trough, there to remain. The patient is then, with the other hand, to lay hold of the other ball having the two distinct and separate wires attached to it, one of which wires the operator places into the second cell of the trough, while he retains the other in his other hand. The patient has now been subjected to the influence of two plates; but the intensity of the galvanism from two plates is so very weak, that not the least sensation is produced upon him. The operator now inserts the last mentioned wire, which he retained in his hand, into the third cell, he then lifts the wire which is in the second cell, and places it into the fourth, and so on, lifting each of the two wires which are attached to the one ball, alternately, taking care that one of them always forms the circuit while the other is moved forward.

In this manner, at each removal of the wires the quantity of galvanism added to that which is already circulating, is so small that no shock is perceived, while the general effect is distinctly experienced on the system as the wires are moved forward. Instead of adding one plate only at each removal of the wire, two, four, or six, may be added, as no distinct shock is perceived from that number; and in this manner we sooner accumulate the necessary intensity. When the patient has been subjected to a sufficient intensity of galvanism, the wires are to be removed backwards in the same manner, to prevent a shock being received.

The effects of this modification of galvanism on the system are very peculiar. As the wires are gradually moved forwards, a slight sensation of heat and a kind of prickling is perceived in the hands and wrists, accompanied with a general glow of heat in the region through which the galvanism passes. As the number of plates is increased, a powerful tension of the muscles and accelerated circulation ensue.

The beneficial effects of galvanism appear to depend entirely upon the passage of the fluid through the system, whereby an increased action of the different organs is induced and the various secretions promoted; and in no degree upon the shock received, which is nothing more than the entrance of the fluid into the system, or rather the superinducement of a particular state upon it. And, without doubt, the more gradually this is effected, and the more imperceptibly the system is again brought into its natural state, the greater will be the benefit derived.

Lest it should be supposed that part of the agency of galvanism depends upon the shock, it may be proper to state, that in every instance the same decompositions are effected in liquids when they are made to form part of the circuit, whether good or bad conductors; and the same states are induced upon the wires, whether the electricity be produced by means of a shock, or in the silent manner.

The mechanical effect of galvanism when given by a shock seems to act more powerfully in producing convulsive motions on animals recently killed, than when given in the silent method; as, when an animal is subjected in this way to electricity of very great intensity, no motions are produced except at the instant the circuit is completed and again broken. On dead subjects, then, galvanism appears to act more powerfully by the mechanical influence of the shock, and convulsive motions are produced. In the living subject, again, while it produces a shock, the good effects seem to depend more upon the stimulus given by the silent circulation of the fluid.

In cases of suspended animation the silent method of applying galvanism appears to be by far the most rational one, as it is quite apparent that the throwing of the body into different electric states, by breaking and renewing the circuit which is the cause of the shock, in order to increase or diminish the galvanic energy, must be any thing but beneficial, as it is just producing an effect one instant to destroy it the next.

Art. XIII.—*Account of the effects of the accidental inhalation of the Gas of burning coal in the Wanlockhead Mines.*

By William Watson, Esq. Surgeon, Wanlockhead.

The Wanlockhead Mining Company finding it expedient a few years ago to place a steam engine on one of their mines for the purpose of lifting the water, had a large turnhead or excavation cut in the rock for the accommodation of the machinery; and that they might the more easily remove the smoke and other impurities arising from the combustion of the coal, they had a flue constructed of fire-brick, the entire length of which was 456 feet, and the perpendicular division of it 384. This they carried through an old mine, the lower part of which being rather soft, required to be supported with wood. The flue till lately answered the purpose extremely well; but on Saturday the 28th March last, the wood supporting the lower part of the excavation in which the flue is placed was observed to be on fire. As fears were entertained that the fire might communicate with the wood in the excavation connected with the machinery, the utmost exertions were made to arrest its alarming progress. These, in so far as the part surrounding the flue was concerned, proved entirely abortive, but were completely successful in preventing the destructive element from reaching the machinery.

The whole of Saturday was spent in fruitless attempts to extinguish the fire, which continued its ravages with unabated fury, and to ascend towards the surface till about 12 o'clock a. m., when the superintendent for the time resolved on closing the top of the flue to prevent the access of atmospheric air, and by that means to cut short the progress of the combustion. The measure in part succeeded, but about 8 o'clock a. m. on Sunday, considerable quantities of smoke were still seen to issue through the dense covering on the top of the chimney; and as there was reason to apprehend that the mine might be laid under water, the overseers were induced to order thirty of the operatives into the mine to remove their tools. At that period, 11 o'clock, ten hours had nearly elapsed from the time that the air-passages had been closed till the miners again entered the mine, during which period combustion had still gone on to a certain extent; consequently the greater part of the oxygen in the mine was consumed, and a corresponding quantity of carbonic acid gas, perhaps a little carbonic oxide, was generated, and rendered the surrounding medium highly noxious, and incapable of supporting either combustion or animal life. It was into this immense mass of irrespirable air then that thirty human beings precipitated themselves, some to the depth of 60, others to the depth of 120 feet. Alike ignorant both of the existence and of the noxious quality of the gas, they perambulated the different ramifications of the mine in search of their implements, with the same unconcern as when it had its wonted supply of vital air. The effects, however, soon became evident on all who had thus heedlessly exposed themselves, and occasioned something like a simultaneous movement from every part of the work towards the pit. But this exertion from accelerating respiration only increased the evil. Debility made rapid strides, and a number of the poor fellows, after making every possible effort to save their companions, sunk into a state of insensibility themselves. At this period one or two of those who had suffered least with considerable difficulty reached the surface, where a number of their companions were assembled in anxious expectation of the issue. Twenty of these with laudable intrepidity hurried into the mine, and had the satisfaction to find that a few had by that time reached a station of comparative safety, though they were extremely weak; but the greater part were still exposed to the deadening influence of the gas. Two were still at the depth of 60 feet, one of whom was lashed to the rope by his companion, who, after performing what he supposed the last friendly office on earth, attempted to leave the death-like scene, but had only reached the distance of 80 feet when he also fell senseless upon the floor of the mine, and was there found by those who went to his assistance. All by the blessing of Providence were ultimately rescued from their perilous situation. The effects produced upon the different individuals were rather curious. Headach, giddiness, tingling of the ears, vomiting, tremor, with extreme debility, were more or less the portion of all. Two were in a state of insensibility for at least 40 minutes; six for a shorter period. Three or four were highly excited, and, although it was Sunday, whistled, sung, and talked with the greatest volubility, occasionally threatening to inflict summary punishment on those near them for alleged injuries, not even recognizing their nearest relations. In many respects they were very like persons in a state of intoxication from ardent spirits. The circulating system was considerably affected. In two cases the pulse was rather full; but in almost all the others it was soft and yielding; and in the two who were longest exposed quick, 94 or 100, small and very compressible. One man had an attack of convulsions six hours after he had ceased to inhale the gas; a second had diarrhœa with considerable tenesmus; a third dysuria; a fourth lost all use of his arms from the elbow downwards for several hours; a fifth had colic; several experienced a slight difficulty in breathing, with oppression about the chest. The shortest period of exposure would amount to forty minutes; the longest to one hour and a quarter.

The remedial measures were free exposure to the external air, with a liberal use of diffusive stimuli, the principal of which was ardent spirits. The limbs were occasionally immersed in warm water with the happiest effects. When nausea was present a few grains of ipecacuan were administered to excite vomiting, and when torpidity of the bowels was induced, colocynth pills with castor oil were given freely.

Wanlockhead, 23*d May* 1829.

The individual who had an attack of diarrhœa uniformly experiences the same effects after indulging in ardent spirits.

ART. XIV.—*Case illustrating the origin of Tubercles in Inflammation.* By JAMES LOMAX BARDSLEY, M. D. Physician to the Manchester Infirmary, Dispensary, Fever Wards, &c. and Lecturer on the Practice of Physic and Materia Medica.

RICHARD MANSEIGH, 42 years of age, became a patient of the House of Recovery on the 9th of December 1828.

On admission he laboured under great general debility, having been seriously ill and in reduced circumstances for several months. His pulse was very small and frequent; his skin was cold and clammy; tongue slightly furred and dry; pupils contracted and fixed. His body emitted a strong disagreeable odour. His mind was confused, and he answered the questions put to him in an incoherent manner. His voice was almost gone, for by the utmost efforts he could only produce a hoarse whisper. He was incapable of swallowing even a tea-spoonful of any fluid without danger of immediate suffocation. Slight pressure on the larynx occasioned him much pain. On the head and different parts of the body there were the remains of a tubercular eruption of syphilitic character. Several cicatrices of old buboes in the groins, and of chancres on the penis, were also present.

Some ineffectual means of relief were adopted, but death shortly released him from further misery.

The body was opened by our very intelligent assistant at the Fever Wards, Mr Wallis, to whom I am indebted for the particulars of the case.

On removing the larynx, the epiglottis was found much indurated, and its left edge was in a state of ulceration. Several minute ossific patches were also detected in it. The internal aspect of the larynx was very unusual. The rima glottidis was almost entirely obliterated, owing to great thickening of the lining membrane; the chordæ vocales were completely gone; and the ordinary appearances of ventricles, sacculus, and chords crossing from side to side, were absent.

The left lung was much condensed, owing to considerable grey tuberculous infiltration. The apex of the right lung was studded with numerous tubercles of a gray colour, and its substance was altogether impervious to air; somewhat lower down the tubercles were less fully developed, and the pulmonary tissue was more vascular; but towards the inferior part of the organ, the inflammation of the pulmonary substance was most marked, and only a few tubercles were present. The shades of difference in these degrees of vascularity were very evident to the eye; and a striking difference in the states of density of the pulmonary tissue was also discoverable to the touch. These appearances are well shown in the drawing, which was taken from the diseased portion of lung shortly after its removal from the body.

The heart was quite sound. The other cavities were not examined.

Remarks.—The chief interest of the above case seems to belong to the *morbid condition* of the lungs as noticed on dissection. The diseased state of the larynx and its appendages, which was the immediate cause of death, had been produced by a severe and protracted syphilitic affection. The detection of the progressive stages of tubercular formation in the right lung appears to throw some light on a question which has excited the interest of some of the first pathologists of the present day, viz. Whether tubercles may be produced by inflammatory action? The decision of this question is of more importance in a practical point of view than may be generally supposed; for the nature of the treatment adopted on the occurrence of symptoms threatening the approach of phthisis, and in the early stages of that disease, will very materially depend upon the opinion entertained by the medical attendant respecting the CAUSE of tubercular depositions in the pulmonary tissue. Whilst the advocates for the *non-inflammatory developement of tubercles*, like Bayle, Laennec, Rostan, Louis, and Velpeau, will hesitate in the employment of antiphlogistic means at the commencement of phthisis, and give the preference to palliatives, the supporters of the contrary doctrine, like Broussais, Andral, and Professor Alison of Edinburgh, will place their chief reliance upon them, in a large proportion of cases, as likely to be most effective in removing or arresting tubercular formations. It may be remarked, that the daily use of digitalis, and the application of leeches, blisters, the tartar emetic ointment, and other irritants to the chest in this disease, are most rationally explained, on the supposition that tubercles are the effect of inflammation.

It is not intended to enter into any general discussion on the point at issue, but merely to state, that the morbid appearances detected in the lungs of the subject of this case strikingly confirm the opinion, that inflammation often precedes the deposition of tuberculous matter in these organs. The different stages of tubercular developement were very distinctly marked. The lungs may be carefully examined in a hundred cases after death, without the lines of separation between the inflamed and tuberculated structures, and the transitions from the one into the other being accurately shown; hence the value of the above dissection. One pathological fact carries more conviction along with it than all reasonings, however plausible and ingenious. It may perhaps be urged, that if tubercles are the effect of inflammation, they should be chiefly developed in the most inflamed portions of the lungs, whereas this did not appear in the present case; but it is most probable (judging from the above noticed morbid phenomena) that chronic inflammation, or a degree of irritation or vascular excitement from some cause or other, is first established in the pulmonary tissue, where modified by temperament it leads to the formation of tubercles, which gradually multiply until the whole be converted into a mass of tuberculous matter. It is difficult to determine the precise nature of the inflammation preceding the developement of tubercles, but it is suggested that it differs from that which constitutes pneumonia, and derives its peculiar character from the strumous diathesis, which experience proves to predispose to tubercular depositions. It is a question whether syphilis would have a like effect.

PART II.

CRITICAL ANALYSIS.

Art. I.—*The Influence of Climate in the Prevention and Cure of Chronic Diseases, more particularly of the Chest and Digestive Organs: Comprising an account of the principal places resorted to by Invalids in England and the South of Europe; a comparative estimate of their respective merits in particular diseases; and general directions for Invalids while travelling and residing abroad. With an Appendix, containing a series of Tables on Climate.* By James Clark, M. D., Member of the Royal College of Physicians of London, &c. &c. &c. London, 1829. 8vo. Pp. 328.

Climate is one of those abstract general terms of which we often speak without attaching to it any very definite meaning. Though all efforts to define such terms are difficult, and not unfrequently hazardous, we shall attempt to distinguish it as that property of a place or country, which, depending partly on geographical situation, partly on physical surface and topographical relations, renders its atmosphere steady or variable, cold or warm, dry or moist, temperate or inclement. Of these qualities it is manifest that the atmosphere is the great medium; and as all changes in it are effected either by changes in temperature, or in humidity, or in its electrical, or perhaps its electro-magnetic properties, it follows, that all those elements which constitute climate are ultimately referable to changes in these qualities; and that in framing a correct idea of the climate of any individual place, it is necessary to inquire carefully, not only into its geographical situation, but into those local and physical peculiarities which invariably contribute powerfully to influence the temperature, and the hygrometrical constitution of its atmosphere.

Of an agent so complex in constitution, the influence on the functions of the living body, though operating in a slow and almost invisible manner, is nevertheless so considerable, that it is by no means wonderful that physicians have at all times attached to it great importance, both in causing and in curing diseases. Its agency in both these operations is so closely connected, that the knowledge of the former is blended with that of the latter; and the facts acquired in the investigation of one subject become extremely useful in guiding our steps in the other. By means of the former class of facts the physician frames his plans for preventing the invasion of disease; of the latter he avails himself, in order to remove disorders already established. In various maladies, especially, which, though assuming originally the acute form, eventually become chronic, or which glide on in a chronic manner from the first, the transition from health to disease is so gradual and progressive, that either medical treatment, properly so called, is of little avail, or the physician is actually perplexed upon which of the organs he should begin to operate, or to which of the functions he should direct his measures. In such circumstances chiefly, the slow and imperceptible, but not unfrequently sure influence of climate presents itself as a remedial agent; and to this both physician and patient begin to turn their regards as the last resource of abortive measures and disappointed expectations. It is then that the invalid is advised to seek an alleviation of his disorder in the genial breezes of a happier sky and more uniform atmosphere than his own, and to hope for a return of health in lands where winter appears divested of the inclemency of these northern regions.

In the course of conceiving and carrying into execution this measure, it is not unimportant to remark, that, though the results of change of climate are so far from being uniformly favourable that we habitually complain of its inefficacy, yet we continue to recommend the measure as one which must be tried, even under circumstances which, to the casual observer, must seem incompatible with its successful issue. While the physician abroad deplores the number of invalids who are sent to breathe their last under his eye, and swell his list of mortality, the physician at home continues to export his hopeless cases, with as much regularity as the merchant to consign his outward bound merchandize. Much of the unfavourable result of such cases is indeed to be ascribed to the untractable nature of the disorders for which change of climate is recommended. But if these disorders are really incurable, it may be asked where is the reasonableness, putting humanity out of the question, of embittering the last period of life by the misery of separation from friends, from home, and domestic comfort? Allowing, however, for that class of cases which, either from the nature or the stage of the disorder, cannot, humanly speaking, be benefited by change of climate, it cannot be denied that there are many other forms of chronic disease which admit of very considerable alleviation, if not absolute cure, by residence in situations where the atmosphere undergoes few changes in temperature and humidity. To insure even moderate success, however, in this respect, it is important that the choice be judiciously made; and one great reason that change of climate rarely affords so much benefit as is anticipated is, that the patient is allowed either to make choice of an improper place, or to go at an improper season. Upon the former point, indeed, it is matter of daily observation, that much ignorance prevails; and that, whatever little information is possessed by many of those whose advice is followed in this particular, is at best exceedingly vague, often very erroneous, and in no instance almost adequate to guide the patient in his choice. The invalid often in this manner learns too late that he has been sent to the worst place that could have been selected; and finds when he can no longer conveniently change his abode, that he has come to reside in a situation where he enjoys no advantages beyond what he had at home, save the melancholy feeling that he has foregone many of his usual comforts. Little else, indeed, can be expected, when it is remembered that all the information collected on the subject is acquired casually by travellers who, in passing rapidly from one place to another, have rested satisfied with the most vague and cursory notices, often procured by hearsay, and rarely verified by personal observation. To obtain accurate knowledge of the climate of any place of abode, a mere casual visit is quite inadequate; and whoever wishes to form a correct notion of it, must spend at least some time in the place, and compare the meteorological phenomena of one season with those of another.

From practical experience of such evils as those now mentioned, Dr Clark was led several years ago to direct his attention to the subject of the actual influence of climate on various diseases of the chest, and, in the course of a pretty long residence on the continent, to ascertain to what extent the places usually resorted to by invalids were calculated to accomplish the object in view. For this task his Notes on Climate, Diseases, &c. published in 1820, showed that he was particularly well qualified, both by powers of accurate observation and sound judgment in framing conclusions. When it is added, that Dr Clark examined personally, by residence of shorter or longer duration, all the places almost of which he speaks in the present work, it is easy to see that his information possesses one quality which greatly enhances its value, not only to the physician, but to the invalid. It is wholly practical and authentic; and every page bears proof at once of the assiduity with which the author has laboured to collect his matter, and of the judgment with which he has regulated its selection. The present is a work which has been long and much wanted; and though it is, excepting the Inaugural Dissertation of Dr Gregory, and a few notices scattered in other works of a more general character, the first and the only one, it bids fair for being the very best that for a long time is likely to issue from the English press.

The work consists of two parts or general divisions; the first on Climate, and the peculiarities presented by that of different situations in England and the continent; and the second on the diseases which admit of benefit by climate.

The manner in which Dr Clark treats his subject is perspicuous and interesting. After some observations on climate in general and on travelling, as remedial agents, he begins the detailed examination of the climate of individual places by a brief survey of those in England, which may be regarded as useful to the invalid whose complaints require the operation of this remedy. On the climate of London he is very brief, as its peculiarities are chiefly to be understood in comparison with those of other places in the south of England or on the continent.

Dividing the mild region of England into the four districts of the *South Coast*, the *South-West Coast*, the *Lands End*, and the *Western Groupe*, Dr Clark considers first the meteorological peculiarities of the South Coast, as they are presented at Hastings, Brighton, Chichester, Gosport, Southampton, and the Isle of Wight. Of this tract the mean temperature during the winter months of December, January, and February, is from one to two degrees above that of London; but diminishing in March, it falls in April nearly two degrees lower, and in May continues one and a-half less than that of London. Ascending again during the summer months, in October it becomes nearly equal. It is also remarked, that while the diurnal temperature is nearly the same at London and on the coast, the nocturnal temperature is warmer at the latter places. In steadiness of climate, no place on the coast appears to possess any advantage over London; and the temperature at Southampton is as variable as that of the environs of the metropolis. The atmosphere of the south coast ought to be more humid than that of London, since the quantity of rain which falls at the former district is to that which falls in the capital, in the ratio of 30 to 25 nearly. Allowing Hastings, Brighton, and the Isle of Wight to possess peculiar climates, Dr Clark classes all the other places from Worthing to Southampton under one head, as a low tract, with a humid, heavy climate, and more or less productive of ague. The character of "heavy," as applied to the climate, we should like Dr Clark to have defined accurately, or to have avoided its use. If applied to the atmosphere, it is manifest that where the pressure of that fluid is most considerable, the climate is generally driest and most salubrious. If used to designate, as it commonly is, the sensations which arise from a humid cloudy atmosphere, these, it will be found, are to be ascribed rather to diminished than increased pressure. The atmosphere is actually locally lighter, but gives rise to sensations which are expressive of heaviness.

Hastings, which has been much resorted to by invalids since it was first recommended by Baillie, Dr Clark agrees with Dr Harwood in representing as favourable to invalids in general as a winter residence, and advantageous in affording the facility of taking exercise in the open air during that season, but unfavourable to those affected with nervous complaints, those subject to headach, and the relaxed in general. The occurrence of ague in its neighbourhood also shows it to be unfavourable to those who have suffered from that disease. Qualities in many respects the reverse of these are found in the climate of Brighton, which is dry, bracing and elastic, and affords a much more suitable residence to the nervous or relaxed invalid, who can bear the cold winds to which it is fully exposed. For an autumnal residence Dr Clark gives it the preference over every other place on the south coast; but he justly represents it as unfavourable during spring, especially to those affected with tracheal, bronchial, or pulmonary irritation, and those whose dyspeptic symptoms arise from irritated stomach. From the qualities of this climate, he recommends most of the valetudinarians who frequent the coast to spend the autumn and beginning of winter at Brighton, January and February at Hastings, and to repair to some sheltered spot in the interior during the vernal months. In the Isle of Wight, the best part is allowed to be Undercliff, a space of about six miles in length, and varying from $\frac{1}{4}$ to $\frac{1}{2}$ a mile in breadth, consisting of a series of terraces resting on a basis of chalk and sandstone, forming a dry soil, and mild dry atmosphere, not very variable.

The coast of Devonshire, which forms the second part of the division of Dr Clark, or the south-western district, has been long resorted to by invalids with tracheal, bronchial, and pulmonary disorders, who require the soothing influence of a mild atmosphere; yet it is remarkable that we possess little or no accurate information on the meteorological and physical characters of its climate. The temperature of the south part of the coast is during the winter nearly 2 degrees higher than that of Sussex and Hampshire, and from 3 to 4 more than that of London; and in the months of November, December, and January, it amounts at an average to 5 degrees higher. Descending, however, in February, it continues during March and April not more than one degree above London, a difference which takes place chiefly during the night. These facts, taken with its peninsular shape, and the sinuous form of the coast, seem to be the only means of explaining the general character of the climate given by Dr Clark, which is that of softness and humidity. The surface of the county, it may be added, is hilly, being a series of elevations rising from the coast nearly to the same height, till in the centre of the county they rise at Dartmoor Forest to the height of from 1800 to 2090 feet, and in the interior and upper part on the confines of Somerset to 1800 at Exmoor Forest. Whether these high grounds, and the general hilly character of the surface, exercise much influence on the temperature and the hygrometrical qualities of the county, appears not yet to be determined. They cannot shelter the surface either from the north or the east wind; and if the latter is less severely felt in this county than upon the east coast of the island, it must be because it has passed over a large extent of the surface of the Channel.

Devonshire has been resorted to chiefly as a residence for invalids with bronchial and pulmonary disorders; and the places hitherto most frequented are Sidmouth, Exmouth, and Dawlish. Though the first of these places has been long resorted to by invalids, and was chosen by Dr Currie of Liverpool to spend the latter period of a life of almost uninterrupted bad health, * Dr Clark regards it as neither possessing the qualities of the Devonshire climate, nor equal to any of the other situations in the country as a winter or spring residence. Situate in the gorge of the valley of the Sid it is open to the currents of cold wind, which blow between the coast and the mountains from which this stream issues. It is allowed, however, to be an agreeable summer or autumnal watering-place. Exmouth, though sheltered, is damp and subject to fogs; yet that it is much frequented by invalids, is proved by the monuments in the parish church, most of which are to the memory of persons who have come to this place often from remote parts of the kingdom, for the benefit of the Devonshire climate, and who have, like others, proved only its inefficacy. Dawlish, situate at the mouth of a small stream, about half way between the *embouchure* of the

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* His monument is in the parish-church, with those of many others who have ended their days in this town.

Exe and the Teign, from which it is about three miles distant, has of late years particularly been acquiring considerable celebrity as a residence for valetudinarians. Though less dry and more exposed to east winds than Torquay, Dr Clark gives it the preference next to this place. It possesses less tomb-stone notoriety than either Sidmouth or Exmouth ; but this is probably to be ascribed to its having been less frequented as a residence than these places.

Of all the places, however, on this coast, none seems to merit greater regard as a winter residence for the invalid than Torquay. Situate at the northern angle of the deep creek of Torbay, and half way nearly between the Teign and the Dart, it is on the one hand sheltered from the north-east and north-west winds, and on the other it is free from those sweeping currents of cold, often accompanied with fogs, which almost invariably blow along the outlets of rivers. Since this immunity extends over a considerable tract of the neighbouring district of Torbay, the residents have an opportunity of taking exercise either on foot or on horseback in the open air, without apprehension of suffering from the severity of the winds. Dr Clark suggests that the village of Upton, about a mile from Torquay, being protected from south-west as well as northerly winds, would afford one of the most sheltered situations on this coast for a Madeira village. But though the coast of Devonshire is mild, its interior partakes of the usual attributes of inland situations, —extremes of cold in winter, and heat in summer ; and while Torquay is comparatively warm in the former season, at Totness, in the interior, the severest frost and ice may be seen.

The diseases in which the coast of Devonshire is represented as most serviceable are chronic affections of the throat, trachea, and bronchia, from irritation or low inflammation of the mucous surfaces, especially when attended by dry cough and no expectoration, irritable states of the stomach, hypochondriacal complaints, dysmenorrhœa, and increased sensibility of the nervous system. It is represented as unfavourable, however, to nervous headachs, nervous complaints with relaxation, pure dyspepsy, with symptoms of impaired tone and languid circulation, and menorrhagia, leucorrhœa, and all diseases attended with marks of relaxation. Regarding its influence on the consumptive, properly so called, Dr Clark thinks it difficult to offer a positive conclusion. In this situation, on the one hand, the invalid is exposed to less severe cold, and for a shorter season, and may enjoy more exercise in the open air, than in any other part of the island. In the south of Europe, on the contrary, though the days are finer, the air drier, and the weather more steady, the transitions of temperature, though less frequent, are more considerable, the nights are colder, and the range of temperature is more extensive; and, as the construction of the houses and the domestic accommodations are less perfect, the invalid suffers in a more acute degree all the effects of this difference. The general accuracy of this character is clearly established by a comparative table of internal and external temperature made at Nice in 1826-7, and Torquay in 1827-8, by the same invalid.

On the Cornish coast, Penzance and Falmouth are the only places particularly considered. The climate of the former, Dr Clark describes chiefly from the accurate observations of his friend Dr Forbes, well known as the translator of Laennec. From these it appears that the range of temperature at Penzance is much less extensive than at London, being with a mean annual temperature of 52°.16, 5½° warmer in winter; 2° colder in summer, scarcely 1° warmer in spring, and only about 2½° warmer in autumn. The temperature of Penzance appears to attain its minimum of depression below that of London in July, when it is 2½° colder than the latter place, and not till October, when, in consequence of the temperature of London falling, while that of Penzance remains stationary almost, does it rise above that of the capital. The nocturnal temperature also during the winter of Penzance is much higher than that of London by 6½° on an average; and so equable appears to be the distribution of heat throughout the year, that Dr Clark regards no place in the south of Europe, save Madeira, as superior to it in this quality. Though the same uniformity of temperature is observed of the diurnal period, Penzance has less advantage over the south of Europe in this respect, since its winter temperature is nearly the same at seven in the morning with that of Rome, but fully 7° less at two in the afternoon. From this it results that the chief advantage of Penzance, compared with the South of Europe, is confined to the temperature of the nocturnal period in winter. In duration of temperature, as shown by the mean variation of successive days, the climate of Penzance excels all northern climates, and in this particular, though coming short of that of Madeira, approaches nearly to that of Rome and Nice. In spring this superiority disappears. In April and May Penzance is inferior to the south-west coast, and very much so to the south-west of France. The mean temperature of Pau in the latter situation is at that season 5° above the mean of Penzance.

The atmosphere of Penzance is, however, humid to an extreme. Though this has not been ascertained by accurate hygrometrical observation, and though the results of the rain-gauge are not exactly accordant with it, both Dr Forbes and

Dr Clark think that no doubt can be entertained of the general accuracy of the fact. Not only are the winds much loaded with watery vapour, but the warm west winds often bring drizzly rain sufficient to wet grass, vegetables, and woollen clothing, while neither the pluviometer nor the streets show traces of rain; and iron undergoes oxydation much more easily than at London. Penzance is also liable to frequent storms of wind, violent and severe; and the keenness of the north and east winds is often sufficient to injure seriously both plants and living beings. The south and south-west winds, however, are a species of moist *sirocco*, which communicate to the inhabitants the sensations of a milder climate than any of this island. Nearly the same general character belongs to the atmosphere of *Falmouth* and the neighbouring village of *Flushing*.

Though in tubercular phthisis Dr Forbes witnessed no instance of cure or even alleviation justly attributable to the influence of climate, yet in many cases of chronic bronchial disease, simulating consumption, the health was greatly improved; in some it was from a state of great debility and danger completely restored; and in a few cases of young persons labouring under symptoms of incipient tubercles, great improvement in health and strength succeeded their arrival. The phthisical cases in which Dr Clark thinks the climate of Penzance most likely to be beneficial, are those in which the bronchial mucous membrane is irritable, with dry cough or little expectoration, and idiopathic tracheal and bronchial diseases, with or without asthma. In relaxed states of the system, on the other hand, when the bronchial membrane secretes copiously, either idiopathically or from tubercular disease, and in hemoptysis, he regards the climate of the Lands End as injurious. As a summer residence, it is superior to the Devonshire coast; but in the winter, and still more in the spring, the latter is to be preferred. Penzance is further well adapted as a constant residence to aged invalids, to whom in general humidity is not injurious. To them especially the mildness of its winter and its nocturnal temperature are great recommendations.

In the West of England the chief places of resort are Bath, Bristol, Clifton, and Cheltenham; and of these Dr Clark gives nearly the same character as those by Chisholm, Mansford, and Nott. The general result is, that the sheltered parts about Bristol and Clifton afford the mildest winter and spring residence in the West of England.

After examining the physical and meteorological qualities of this part of the British dominions, Dr Clark sums up their sanative influence in the following manner:

" I may remark here that it is, with a few exceptions, only as a means of preventing the occurrence of tubercular disease of the lungs, when threatened, or of checking its progress in its early stages, that much benefit can be expected from climate. With this view, the preference to be given to any of the milder situations in England, in such cases, must depend greatly on the nature of the person's constitution, and partly also on the other morbid states with which the consumptive tendency may be complicated. Keeping these circumstances in mind, the situation which admits of the invalid being most in the open air without risk from cold should in general be preferred. The selection will, I believe, be among the following places, as winter and spring residences,—Torquay, Undercliff, Hastings, and Clifton; and perhaps in the generality of cases, they well deserve the preference in the order stated."

"In diseases depending upon or connected with much general or local irritation; in chronic inflammatory affections of the throat, trachea and bronchia, accompanied with little expectoration; in indigestion, arising from a heated and irritated state of the stomach, and in the nervous and hypochondriacal affections originating in such a state; in dysmenorrhœa, and in dry irritable cutaneous diseases, the coast of Devonshire affords the most favourable winter climate. In cases of the kind referred to, in which it is desirable that the invalid should remain stationary during the whole year, the Lands End would perhaps be preferable to the coast of Devon."

"In chronic diseases of the trachea and bronchia, on the other hand, which are attended with copious expectoration and dyspnœa; in dyspeptic disorders of a purely nervous character, and where there is a relaxed state of the system, or a tendency to copious mucous or sanguineous discharges, the climates of the south-west of England and the Lands End are unfavourable. It is indeed difficult to find any place in our island, the climate of which is very suitable for such cases during the whole of the cold season. Brighton is, I believe, the most favourable residence during the autumn and early part of the winter. The climate of this place is generally mild and equable, and the air comparatively dry and elastic at this season. But during the latter part of the winter, and still more in the spring, Brighton is cold, being exposed to all the severity of the north-east winds. Hastings is then considerably warmer and more sheltered. The neighbourhood of Bristol and Clifton affords a good spring residence in the affections which we have noticed; but the distance from the south coast will render such a change in general unadviseable as well as inconvenient. Invalids labouring under the chronic affections mentioned, and who cannot absent themselves from London during the whole season, might go to Brighton during the autumn and early part of the winter, remain in town in the winter, and go to Clifton in the spring; or should this be inconvenient, Chelsea and Brompton afford sheltered spring situations which might be found suitable."

The south of France, which Dr Clark next proceeds to survey, is arranged in the article of climate in two great divisions;—the south-eastern and the south-western districts. Under the west and south-west of France is included the tract of country from Britanny to Bayonne, comprising L'Orient, Nantes, La Rochelle, Bourdeaux, Montauban, Pau, and Toulouse, with the Islands of Guernsey and Jersey. In climate, this part of France resembles that of the south-west of England. Though less warm than the south-east of France, its temperature is more uniform and invariable, and its range is less extensive both throughout the year and during the diurnal and nocturnal periods respectively. It is, however, more liable to daily changes not inconsiderable. The climate, which is soft, relaxing, and rather moist, is suitable for complaints to which the dry air of the south-east is unfavourable, particularly inflammatory dyspepsia, and cases of dry tracheal and bronchial irritation. The coast of Britanny, in the experience of Laennec, proved favourable to consumptive patients, and the proportion of consumptive cases from this district, the same observer found to be small. This climate will be proper also in dry scaly eruptions of the skin; in dysmenorrhœa; in headachs induced or aggravated by sharp north-east winds; and in those states of the system which are attended by high morbid sensibility and a tendency to excessive capillary tone.

Pau, the capital of the department of the lower Pyrenees, appears to be the place at which Dr Clark thinks invalids who visit this part of France may with propriety take up their residence. This town is situated on a ridge of gravelly hills with the Pyrenees rising gradually behind, and their highest range at the distance of 40 miles. From this peculiarity probably its atmosphere derives that degree of calmness by which it is distinguished, high winds being rare and short in duration. Its mean annual temperature is 4½° higher than that of London, and about 3° higher than that of Penzance; 5° lower than that of Marseilles, Nice, and Rome; and 10° lower than that of Madeira. Its winter temperature is 2° degrees greater than that of London; but 3° below that of Penzance; 6° below that of Nice and Rome; and 18° below that of Madeira. Its vernal temperature again is 6° higher than that of London; 5° above that of Penzance; 2½° below that of Marseilles and Rome; and 7° below that of Madeira. The range of temperature between the warmest and coldest months at Pau is 32°, 6° greater than at London and Rome; 14° more than at Penzance; and 18° more than at Madeira. The daily range is at Pau 7½°, at Penzance 6½, at Nice 8½, and at Rome 11°.

Though the annual quantity of rain has not be measured at Pau, yet, from the fact that the number of rainy days amounts to 109, during which the west wind generally prevails, this climate must be characterized as rainy. It is, nevertheless, not humid; and as the soil is absorbent, and it rarely rains above two days at once, the ground dries rapidly, and the hygrometer does not indicate great humidity. The atmosphere, in short, is dry when it does not rain; and it is free from fogs and cold piercing winds. In October, when snow falls in the Pyrenees, the thermometer descends and the weather becomes cold and chilly. In November again it becomes milder; and though December and January are cold and dry, with occasional frost and snow-showers, the snow does not lie; and the warmth of the sunshine enables the invalid to take exercise from twelve to three. February is mild, except at the end of the month, when the spring rains render the atmosphere cold and disagreeable. The mildness of the spring in general renders the vernal exacerbations of inflammatory disorders of the lungs and stomach little felt at Pau. April is warm, and distinguished by vigorous vegetation; and, as the season advances, the temperature increases till in July, August, and September, it is so hot as to prevent exercise from eight in the morning till seven in the evening.

The town is said to be healthy. Measles, scarlet fever, and hooping-cough are almost unknown. Agues and bilious fevers are most prevalent; and rheumatism is so common as to assume an endemic character. Goitre is common among the peasantry. Scrofula is rare; and consumption is not common. The mildness of the spring, and its immunity from winds, render the climate of Pau favourable to chronic affections of the larynx, trachea, and bronchia. Dr Playfair found it useful in inflammatory dyspepsia, and in some cases of asthma. The effect of climate in alleviating these affections of the mucous membranes may be aided at the same time by the mineral waters of the Pyrenees, among which Dr Clark speaks most highly of those of Bonnes. For rheumatism and bronchial diseases, with relaxation and copious secretion, the climate of Pau is not recommended; and Dr Playfair, who resided here a considerable time, regards it as too changeable in consumptive diseases.

The climate of the south part of France, which has been almost habitually recommended as a residence for pulmonary invalids, Dr Clark begins with condemning generally as altogether unsuited to persons labouring under such disorders. From the remotest periods we learn from Lucan that this region has been liable to the ravages of the *Circius*, a wind of the utmost impetuosity and violence; and if the effects of this pernicious blast in pulmonary disorders had been understood, no residence in this part of the continent could have ever been recommended. The general character of the climate is dry, hot, harsh, and irritating. The temperature, both annual and daily, is unequally distributed; and while the summer months are greatly warmer than in our island and the south-west coast of France, the winter may be so inclement, that even in ordinary years the orange-trees are killed by the frost, and on some rare occasions, as in 1709, the ports of Marseilles and Toulon are frozen over. The *mistral* also, which prevails here during winter and spring, is most injurious to pulmonary disorders, to affections of the tracheal and bronchial membranes, and to irritable states of the digestive passages. The climate of Provence, however, is allowed to be favourable to invalids of torpid relaxed habit, of gloomy desponding minds; and in some cases of chronic agues it proves beneficial.

In the more detailed account of Montpellier, Marseilles, Hyeres, Nice, and Villa Franca, Dr Clark repeats and amplifies the character of these places formerly given in his Notes. To Montpellier, Marseilles, and Aix, which from the account of native physicians are prolific of consumption in all its forms, he is decidedly hostile. Hyeres, though more favourably situate, and not particularly subject to consumption, he represents as not sufficiently sheltered from the mistral to form a desirable residence for the pulmonary or consumptive invalid. The immunity from consumption Dr Clark is inclined to ascribe to the agricultural labours in which most of the inhabitants are engaged.

The climate of Nice, though approaching to that of Provence, he represents as in several respects superior. With a mean annual temperature of 59° = 9 higher than London, 7° higher than Penzance, 1° below Rome, and 5° below Madeira; and a mean winter temperature of 48°, and spring of 56°, it possesses a more equable distribution than any other place in the south of Europe, except Rome and Cadiz, less range of temperature, and in steadiness it ranks next to Madeira. The weather during winter is settled and fine; and though the sky is unclouded, and the atmosphere clear, the temperature rarely sinks to the freezing point, and that only during night,—a remarkable proof of the mildness of the climate. Though Nice is sheltered from the mistral, it occasionally feels a little of the western termination of this wind, in the form of a keen dry breeze, producing remarkable exsiccation. From the testimony of the intelligent Risso, the northerly gales appear to pass obliquely over the town and its vicinity; and when the *sirocco* blows, which is rare, it is not absolutely unpleasant. The chilling easterly winds are the most pernicious to the pulmonary invalid. Lastly, though much rain generally falls in October and November, and at the winter solstice and the vernal equinox, the climate of Nice is upon the whole dry.

Exempt from endemic diseases, and rarely affected by epidemics, Nice is entitled to the character of healthy. Catarrhal disorders, nevertheless, and pneumonic inflammation, especially in the spring, are not uncommon; and consumption, though less frequent than in England and France, causes a certain proportion of the mortality, especially of the town population. In the hospital it is said to amount to $\frac{1}{7}$th of the whole. Gastric fever, chronic gastritis, and gastric disorder in general, form the leading features of disease. Agues are not unfrequent; and are abundantly produced by the flat grounds along the banks of the Var. From this, however, the stranger has little or nothing to fear. Diseases of the eyes, especially amaurosis and cataract, are frequent. The elephantiasis of the Greeks is said to occur occasionally in certain warm spots in the neighbourhood, and even along the coast as far as Marseilles.

Though Nice has been much recommended as a residence for the consumptive, Dr Clark expresses strong doubts of the propriety of the measure. When the disease is complicated with inflammatory or irritable states of the tracheo-bronchial or gastric mucous membrane, the climate of Nice he regards as decidedly unfavourable, and even liable, without extreme care and strict regimen, to aggravate the symptoms of the malady. The only cases of consumption which he thinks may be sent hither are those in which the habit is torpid and void of much irritability. Dr Skirving, to whom the author makes his acknowledgments for much information, thinks he has seen the climate of Nice operate favourably as a preventive measure; and in some cases in which there was reason to believe that tubercles already existed in the lungs its influence appeared to be beneficial. But in advanced stages of the disease, both he and Professor Foderé agree in regarding the climate of Nice as rather injurious than useful. In chronic bronchial diseases simulating consumption, on the other hand, especially bronchitis, with copious expectoration, (*humoral asthma*) and the chronic catarrh of the aged; in certain cases of asthma; in gout; in chronic rheumatism; in scrofulous complaints of children; in dyspepsia and hypochondriacal disorders; in complaints of relaxation; and especially in those of young females connected with irregularities of the uterine function, the climate of Nice is beneficial in a greater or less degree. In that now numerous class of patients, whose constitutions have been impaired by long residence in tropical countries, and the debilitating influence of repeated courses of mercury, the climate of Nice will produce the happiest effects.

The part most recommended by the author for residence is the suburb called *Croix de Marbre*, and along the beach from the town to the ridge which bounds the plain on the west. For those who are susceptible of injury from damp, he recommends houses at the foot of the hill, on which stood *Cimiez*. The best time for arrival is the beginning or the middle of October; and departure should not take place before the beginning of May.

The climate of *Villa Franca*, situate on the bay of the same name, about two miles to the east of Nice, does not essentially differ from the latter. Though more sheltered from the north and north-west winds, it is more exposed to the easterly breezes, which are injurious to the pulmonary invalid. Of *Menton* and *San Remo*, both on the road from Nice to Genoa, the author speaks more favourably; but want of accommodation is to the invalid want of every thing.

The climate of the Italian Peninsula is, from its shape, its extensive coast, and its physical surface, greatly diversified. The observations of Dr Clark apply chiefly to the tract which lies between the northern shores of the Mediterranean and the southern base of the Apennines. The climate of this region is warmer and less humid, but subject to a greater range of temperature than that of the south-west of France; it is softer, less dry, and less harsh and irritating than that of Provence; and while the Alps shelter it from the north winds, and the Apennines from the east, it receives the full influence of the south. It is justly observed by Dr Clark, that the principal circumstance which appears to modify the general character of this climate at different places, is their relative position with respect to the coast and the Apennines.

Genoa, placed between steep mountains and the sea, is liable to extremes and irregular distribution of temperature; and though the air is dry and healthy, it is exciting to invalids, and decidedly unfavourable to the pulmonary and consumptive. It appears, indeed, that the mortality of Genoa is chiefly caused by inflammatory disorders of the respiratory organs and by tubercular consumption. *Florence*, in like manner, though in many respects an agreeable residence, is improper for the invalid, and especially for the consumptive, from the sudden transition of temperature, and the cold penetrating winds to which it is liable. Inflammation of the lungs, *mal di petto*, appears to be frequent during the winter, which is wet and severe; and it annually sweeps away great numbers of the poorer inhabitants, whose houses are imperfectly constructed, and afford little shelter against the inclemency of the season. The climate agrees badly with children; and worms and dysentery are common. *Pisa*, with a considerable range of diurnal and nocturnal temperature, is nevertheless represented as a more favourable situation. The climate, though heavy and damp, is said to be genial; softer but less warm than that of Nice; and less soft, but less heavy and depressing, than that of Rome. Though the most common acute diseases are peripneumony, dysentery, and gastric fevers, and chronic bronchial affections are frequent, consumption is said to be rare. Agues have diminished in frequency since the country has been drained and cultivated; but double tertian is endemic in the hospital, and attacks most of the patients who have undergone operations. *Spina ventosa* and affections of the bones appear to be more common than in other parts. Of *Naples*, again, the climate is extremely unfavourable to consumptive invalids. Similar to that of Nice in general characters, it is, however, more changeable, and more unequal in distribution of temperature; and though softer in winter, it is more wet and damp, and suffers severely from the sirocco.

To this class of invalids, *Rome*, on the contrary, with a mild, soft, but rather relaxing atmosphere, is more favourable. Being further little disturbed by winds, it is valuable as a winter residence for those affected by diseases of the larynx, trachea, and bronchia; and is useful to invalids in general who are thus enabled to be much in the open air. The *tramontana* or north wind, which is dry, keen, and irritating, like those of Provence, is the most injurious; but it seldom continues long. The relaxing effects of the *sirocco* are little felt. The diseases most prevalent at Rome are *malaria* fevers or agues of the same nature and character as those of the fens of Essex and Lincolnshire, of Holland, and of most other parts of the globe where the soil is moist or not much cultivated. In the course of some interesting observations on these fevers, for which we have not room, we have pleasure in observing, that Dr Clark refutes several vulgar errors regarding the mode in which these fevers are most liable to attack the human frame. He maintains the necessity of some residence in the country to predispose the system to the disease; and thinks there is no ground for the fear commonly entertained of a sudden attack of *malaria* from simply passing rapidly through a malaria district. He also rejects as erroneous the opinion, that full living and a liberal allowance of wine are the best means of preserving health in situations subject to ague. The general tendency of this regimen is to derange the digestive organs,—a state of system very favourable for the operation of malaria. Plain moderate diet, which is the most conducive to general health, he regards as the most powerful preservative against the influence of this invisible agent; and whatever may be the effect of stimulating food and drink in the damp atmosphere of Holland, it is remarkably injurious under the exciting sky of Italy. Sleeping with open windows either by day or night is dangerous. Towns are safer than villages; villages than country-houses; and the central parts of a town are safer than the suburbs.

In the inhabitants of Rome the nervous system is peculiarly delicate, sensible, and impressible; and many of the disorders to which they are most subject are those of the nervous system, and are very frequently attributed to violent mental emotions. The multifarious variety of diseases referred to the general head of *Accidente*, and which attracted the attention of Lancisi under the name of *mors subitanea*, are so diversified in origin, that we should doubt whether they can really be referred to the excessive mobility of the nervous system. Many of them no doubt belong, as Lancisi showed, and as Dr Clark admits, to the disorders of the heart and large vessels. That they are occasionally referable to apoplexy and similar cerebral diseases is perhaps not improbable, when it is remembered that the vulgar rarely distinguish between instantaneous extinction of life, and death which takes place after twelve or twenty hours of loss of sensation and motion.

Next in point of frequency among the diseases of the Roman winter and spring, may be placed inflammatory affections of the chest; and in general pneumonic inflammation is both violent and rapid. Tubercular phthisis is not very frequent, most of the chronic affections being the consequence of acute pneumonic inflammations, which are most frequent among the poorer and badly clothed ranks, and may often be traced to the effects of ague. The deaths from consumption were said to be not more than one in fifty; but Dr Clark is satisfied they are much more numerous than this. Headachs are common. Rheumatism is not frequent. Chronic cutaneous disorders are less common than formerly.

The climate of Rome is favourable to the early stages, but of no use in the advanced periods, of consumption; it is generally beneficial to bronchial affections with much irritability; and it alleviates rheumatism; but is unfavourable to apoplexy and hemorrhagic diseases in general.

The best residence is the *Piazza di Spagna* and vicinity; and it is always desirable that the apartments of an invalid should have a southern aspect. Visits to churches, museums, and the ancient baths are highly dangerous to the invalid, and should either be avoided entirely, or made on a warm day, and for a very short period. The best period for arrival is October; and if symptoms remain, the invalid should not depart till the beginning of May.

The situations which are necessary for the winter residence of pulmonary and consumptive invalids are unfavourable during summer; and it is therefore requisite to choose for residence in the latter season situations where they may suffer less from the oppressive heat. Invalids not consumptive may remain in Italy; and the places of most general resort are the vicinity of Naples, Sienna, and the baths of Lucca. In the first neighbourhood *Castelamare* is a good residence, though hot in the evening; and the island of Ischia is recommended by the celebrity of its baths, which are really beneficial in chronic rheumatism, chronic affections of the periosteum, local palsies, and obstinate cutaneous disorders. *Sienna* is also useful in being cooler than Naples, Rome, Pisa, or Nice; and though injurious to the pulmonary invalid, is safe to the nervous, the relaxed, the dyspeptic, and the hypochondriacal. Finally, for invalids of the same class the baths of Lucca constitute a good residence in the months of June, July, and August.

Consumptive patients, that is both those actually phthisical and those threatened by phthisical symptoms, Dr Clark recommends to quit Italy entirely at this season, that is, before the end of June, and repair to Switzerland, where the borders of the lake of Geneva afford an eligible residence. A sea voyage during the summer may also be beneficial; but the Mediterranean must be avoided, and the Atlantic is better suited for this purpose. In cases in which the laryngeal, tracheal, or bronchial mucous membrane is inflamed chronically, or in a state of irritation, residence in some of the mineral water districts may be expedient; and for this purpose Dr Clark recommends those of EMS on the Rhine, of BONNES and of CAUTERETS among the Pyrenees, and of MONT D'OR among the mountains of Auvergne, the last of which is represented as especially favourable in inveterate cases complicated with disease of the skin. The use of ripe grapes to the amount of several pounds a-day, or what is denominated by the foreign physicians *La Cure de Raisins*, is recommended under the direction of a physician on the spot.

On the climate of Madeira, in addition to the observations formerly published by Dr A. H. Renton in this Journal, Dr Clark gives the reader the results of those of Drs Gourlay and Heineken. Of these the general result is, that while the climate of this island is sufficiently beneficial to cases with incipient symptoms of phthisis to justify more frequent trial at this period of the disease, it is utterly useless to confirmed tuberculous cases. The climate, however, Dr Clark regards as the finest and most agreeable in the northern hemisphere, and upon the whole the most expedient, by its mildness both in winter and summer, and its steadiness, for residence throughout the year.

In the second part of the work, after some general remarks on the precautions necessary to be taken by invalids in travelling, and the rules to be adopted in clothing, diet, exhibition of medicine when requisite, and other circumstances important to the health and comfort, the author proceeds to take a view of the diseases for which climate promises to be beneficial. Under the first head is placed the trite but important subject of disorders of the digestive organs; and on this topic perhaps many readers may imagine that so much has been already written that little novelty and less information can reasonably be expected. If this opinion have any just foundation, it must be regarded as the best panegyric on the observations in the present volume, when we say that we have nowhere seen so distinct and perspicuous an account of the characters of the two principal forms of dyspeptic disease as that given by Dr Clark. Notwithstanding all that has been written on the nature of these disorders, and on the multifarious and often opposite remedies by which they are recommended to be treated, we believe the general impression is, that they defy classification, and that the treatment is in a large proportion of cases wholly empirical. So much of this confusion is removed by the present author, that we must entreat the indulgence of our readers to the following extracts, in which they will peruse Dr Clark's description in his own language. After a few observations on the different classes of *agents* by which digestion is liable to be disordered, Dr Clark proceeds:—

"The morbid conditions induced by these agents are of two different kinds:—(1.) an irritated state of the mucous surface of the stomach of an inflammatory character; and (2.) a highly increased degree of sensibility of the nerves of the same part, accompanied mostly with a loss of tone of the whole viscus. The latter affection constitutes the proper, pure, or *Nervous Dyspepsia;* the former, for the sake of distinction, may be called *Gastritic Dyspepsia.* Excesses in diet are, according to my observation, the most frequent cause of gastritic dyspepsia; whilst intense and long-continued mental exertion, a sedentary life, a fluid relaxing diet, and constipated bowels, give rise, most commonly, to the nervous form of the disease. The manifest difference in the pathological character of these two morbid states shows, in a striking manner, the error of applying the same mode of treatment to all cases of disordered stomach.

"The symptoms characteristic of these two forms of Dyspepsia are often distinctly marked. In the gastritic or inflammatory species, the pulse is very generally contracted, and often quickened, especially after meals and towards night. In the nervous species, the pulse is in general little changed, though occasionally it is slower than natural, and there is no disposition to fever. Headach, which is so common and so distressing a symptom of stomach disorders, is more constantly connected with nervous dyspepsia; and its character differs also from that of the headach which accompanies the pure gastritic form.

" The headach arising from nervous dyspepsia, in its severer form, is generally preceded by a sense of coldness and creeping on the surface, particularly in the extremities, which sometimes amounts to shivering; nausea, or even vomiting, occasionally occurs at this stage: there is an insipid milky taste, with a clammy state of the tongue, and the pulse is slower than natural. In the commencement, there is rather a sensation of uneasiness than of actual pain; but as the feeling of coldness diminishes, the true headach becomes developed. The pain then is intense and throbbing, and affects one side in general more than the other; the temples are most frequently the seat of the severest pain. The upper and back part of the head is also often affected; and the latter place is particularly apt to be so, when the headach is partly dependent on uterine irritation. During the continuance of the pain, there is great susceptibility of the nervous system.

" In the headach which attends gastritic dyspepsia, the paroxysm is by no means so regular, nor so sudden in its attack. It is not usually preceded by coldness, but is often accompanied by a sense of burning in the hands and feet, and flushing of the face. The pain is of an acute character, and is also most frequently combined with a sense of distension; the forehead and temples are its most frequent seat. It frequently terminates by vomiting. The period of attack is usually the evening, or during the progress of digestion; and whatever excites the stomach tends to bring it on, or increase when present. The headach of nervous dyspepsia is more liable to come on in the morning than at any other time; often it begins on first awaking; and at all times it is more apt to make its attack when the stomach is empty, than during the process of digestion. Mental impressions, or causes acting through the medium of the nervous system, more frequently induce the nervous headach; though certain articles of food, which irritate rather than excite the stomach, are also a very frequent cause. Nausea and vomiting are more common in the gastritic; flatulence, vertigo, tinnitus aurium, deafness, dimness and other affections of vision, in the nervous dyspepsia.

" In gastritic dyspepsia, the tongue is redder than natural, especially towards the extremity, and along the edges; in these parts it is also generally beset with small elevated points, of a still brighter colour. It is also more or less furred. The fur increases towards the base, and the red papillæ, here of a large size, are often seen projecting through it. The tongue is often dry and parched in the morning and during the night. But these, and other appearances of the same part, are modified, in some measure, by the age and temperament of the patient, by the degree and duration of the irritation of the stomach, by the state of the bowels, and by the nature of the medicines which have been employed. When the disordered state of the stomach has existed for a considerable period, the tongue often assumes a sodden appearance, and becomes as it were lobulated, with numerous fissures on its surface; in this case it is rather clean, or, if furred, it is in detached patches, the intervening spaces having a glossy aspect. This state of tongue I have remarked most frequently in persons who have lived fully, and been in the constant habit of using drastic purgatives.

" In nervous dyspepsia, the tongue deviates less from the natural state, it is generally pale or covered with a thin white fur, but rarely dry. In some mixed cases, it has a swollen, œdematous appearance; and the impressions of the teeth are visible along its margins, especially in the morning. The gums, in gastritic dyspepsia, are often red, swollen, and spongy; and small aphthous ulcers are apt to form on the tongue and lining of the mouth; and the fauces are habitually red, and often dry. In this species, also, there is more epigastric tenderness, and more disposition to thirst than in the nervous form. In the latter, the bowels are more obstinately costive, and the urine habitually pale, often very copious; and the extremities are usually cold. In the gastritic form, the urine is generally high coloured, and often turbid; the skin dry and parched, and frequently affected with eruptions; and the feet and hands, though occasionally cold, are at times unnaturally warm, particularly in the night. Nor are night perspirations during sleep at all uncommon. The face is apt to flush, generally or partially, especially after meals; and the eyes, and still more the eyelids, are very subject to inflammation.

" The sleep in both species is unsteady. In the gastritic form, when of some duration, the early part of the night is generally sleepless, whilst towards morning there is a heavy oppressive sleep, followed by a feeling of weariness on awaking, rather than the refreshment which succeeds to natural rest. In the nervous species, the sleep is better, but often and easily interrupted, and frequently unrefreshing.

" The mind is affected in both cases. In the gastritic species it is more irritable; in the nervous it is listless, frequently depressed and disposed to melancholy; but the most severe and obstinate cases of mental despondency, arising from a deranged state of the digestive organs, which I have witnessed, appeared more connected with the gastritic than the nervous form of the disease.

" The effects of an irritated state of the digestive organs on the temper, is illustrated in a very striking manner in children, in whom they are seen uncomplicated with mental causes, to which they are in after-life so generally, though often very erroneously, attributed. Such a state of the digestive organs, when protracted, is a frequent cause of dulness in boys at school, by rendering them incapable of mental application. The head is often blamed on those occasions, when the stomach is more in fault. By too much and over-stimulating food at this early age, the mind, as well as the stomach, may be permanently injured. By the influence of long-continued irritation of the digestive organs on the nervous system, at a later period of life, the disposition is often so thoroughly changed, the mind rendered so incapable of application, and the memory so much impaired, that the sufferer becomes unable to apply himself steadily to any thing, and is quite incapacitated for his usual avocations, and even unfitted for the ordinary intercourse of social life. Epilepsy and insanity, generally of the melancholy character, are not unfrequent consequences of such a state, and in other cases it leads the unhappy victim to terminate his miseries by self-destruction.

" Independently of the particular symptoms which I have pointed out as belonging to each form of dyspepsia, there are circumstances in their general character which distinguish them. The symptoms which accompany gastritic dyspepsia are more fixed and permanent; they may be present in a greater or less degree, according to circumstances, but they are never absent. In nervous dyspepsia, on the contrary, the symptoms vary in a remarkable manner. The patient feels at times almost entirely free from them, and the functions of the digestive organs are performed with scarcely any indication of derangement; or, all the symptoms of the disease are often greatly augmented, the patient being unable to assign any particular cause either for their disappearance in the one case, or their increase in the other. Nervous dyspepsia is also much more under the influence of mental affections, of changes of the weather, and other causes which particularly affect the nervous system ; while the symptoms which characterize the gastritic form of the disease are more considerably and decidedly increased by stimulants of every kind taken into the stomach. The former is even sometimes temporarily relieved by these latter means.

" In mixed cases, these distinguishing characters will be observed more or less as the one or other form of dyspepsia prevails; for the gastritic and nervous species of dyspepsia are easily convertible into each other, and even frequently exist together in the same subject. In this last case, we have both the inflammatory excitement and extreme morbid sensibility,—the one or other state predominating at different times. Cases of this kind are perhaps the most common, and they are certainly the most difficult to treat. Yet in all these mixed cases the leading characters which show the prevailing nature of the affection, are generally sufficiently distinct. Nervous dyspepsia, if long continued, generally terminates in the gastritic species; the latter, as far as I have observed, rarely changes permanently into the former." Pp. 181—189.

Of the accuracy of this description it is unnecessary to speak. No one we believe who has been practically much conversant with the disease will fail to recognize the great general features of the delineation.

After some further remarks on the disorders with which they are liable to be complicated, and especially on that of the hepatic secretion, Dr Clark takes occasion to deprecate the pernicious practice so often resorted to of exhibiting blue pill and other mercurials in all cases of stomach disorders indiscriminately. These, he justly remarks, may be useful in certain cases; but the indiscriminate use which has been so frequent of late years, instead of curing the disease for which they are exhibited, often proves the unintended means of permanently breaking down a constitution, which more cautious and rational remedies might have strengthened and confirmed. Many instances of this inauspicious result of blue pill and calomel practice Dr Clark had occasion to see on the Continent,—sent abroad evidently to retrieve powers which were irreparably lost by the injudicious use of the mineral.

In his remarks on treating the two forms of dyspepsia, for the gastritic form he recommends such climates as Devonshire, or the south-west of France as at Pau, or those of Rome or Pisa in Italy. For the nervous variety, again, of the disease and hypochondriasis, he regards Nice as better suited, and Naples rather than Pisa and Rome. The dietetic and medical directions we are compelled to omit entirely; but in doing so we recommend the perusal of the observations of the author as containing a fund of much judicious instruction, improved and confirmed by experience. These observations indeed may be recommended to the particular attention of the invalid; and no one who quits home for the important purpose of improving his health should do so without studying repeatedly this part of the work of Dr Clark. They will show him how much depends upon attention to diet, and the due management of the cutaneous and the digestive functions; and when he is disposed to look on his physician as over-rigid and scrupulous in exacting compliance with rules and observances, they will show him the benefit with which he is to be rewarded for the sacrifices made. The following summation with which the author concludes this disquisition may not be unseasonable.

"1*st*, Dyspeptic complaints are chiefly referable to, and have their origin in two leading pathological conditions of the stomach, —the one of an inflammatory, the other of a nervous character.

"2*d*, These two states require two different methods of treatment, and are benefited by climates of a different character; a soft and mild climate, such as that of the south-west of France and of England, being more suitable to the inflammatory form; and the drier and more exciting climates of the south-east of France and Nice, more beneficial in the nervous and congestive form.

" *3d,* In complicated cases of dyspepsia, which are the most frequent, the method of treatment, both generally and as regards climate, must be regulated chiefly by the morbid condition which is the more predominant, and which influences the constitution most evidently. When a secondary series of disorders has been induced, these, as well as the hereditary disposition of the patient, must also be taken into consideration, in selecting a fit climate.

" *4th,* Mineral waters are very valuable remedies in chronic disorders of the digestive organs, and will frequently effect cures after climate and suitable regimen have failed to do more than relieve.

" *5th,* The advantages to be derived from change of air, climate, mineral waters, &c., depend, in a great degree, upon the proper application of these agents to the nature and degree of the disorder, and upon the regimen followed by the patient during their operation.

" *Finally,* No change of climate, or other remedy, can be made permanently beneficial, while the exciting causes of the disease continue to be applied." Pp. 221, 222.

On the subject of the sanative influence of climate on consumption, Dr Clark begins by a short but judicious view of the pathological cause of that disease. He justly rejects the notion of the possibility of curing tubercles when once formed; and the idea of expecting recovery from the expulsion of the tubercular masses he regards as applicable to so small a proportion of the cases, as not invalidating the general accuracy of the proposition, that tubercles cannot be cured, and therefore unfit to give rise to any useful practical measures. In proceeding to inquire into the proximate cause of tubercles, with a view to frame rules for preventing their formation, he rejects the opinion, that tubercles are the result of inflammation,—*first*, because observation shows that tubercles may be formed without traces of the inflammatory process; and, *secondly*, because inflammation in all degrees and stages may exist without giving rise to the formation of tubercles. He admits, nevertheless, that instances occur in which the appearance of tubercles is connected with the presence of inflammation; but he thinks this is inflammation occurring in, and modified by, a peculiar state of the system,—a disordered or cachectic state. He admits also that pulmonary inflammation in persons otherwise disposed, though not the cause of tubercles, is very likely to accelerate their formation; and from this the physician may derive practical rules of the utmost utility. On the topic of the intimate nature of the process by which tubercles are developed, he adopts the opinion of Dr Todd, who, in his observations *on the process of reproduc-*

tion of the members of the aquatic salamander, infers that tubercles are the result of the deposition of lymph in consequence of an aberration of the function of atomic nutrition, by virtue of which the materials destined to the repair of the healthy organs and textures are deposited in the interstices of the textures in irregular atoms endowed with a lower rate of vitality. This opinion, though very difficult to demonstrate directly, is by no means improbable; and we think it accords well with the phenomena and progress of tubercular diseases. The state of the system which favours the tubercular deposition Dr Clark distinguishes by the name of *tubercular cachexy*, and thinks it is to be recognized by peculiar characters and symptoms exhibited by the personal appearance of the individual. These marks are chiefly those which have been enumerated by authors as characterizing incipient phthisis, and appear to be referable chiefly to the deranged state of the circulation and secretions of the skin and the mucous membranes. Though we cannot enter into a minute account of the well-drawn picture which the author here delineates, we cannot quit the subject without bearing testimony to the clearness and general soundness of his views on this difficult and obscure subject. It is unfortunately one on which direct proof cannot be obtained; and the only mode in which we can expect to approach the truth is by the application of judicious reasoning to the facts supplied by just observation. The manner in which the present author avails himself of physiological and pathological knowledge, of observation of the functions of the living body, and the effects of disorder in the dead, to elucidate the question of the origin of tubercular disorders, is at once ingenious, and we think by no means overstrained; and if he does not absolutely prove the existence of such a state as the tubercular cachexy, he renders its existence highly probable.

Of these theoretical views it is no small recommendation that they form the basis of a very rational system of management to prevent the developement of tubercular disorganization in young persons, who, from the history of their family and hereditary peculiarities, may be expected to inherit the seeds of this baneful tendency. He recommends indeed to commence from the tender years of infancy to guard against the appearances of the tubercular cachectic state, by all those means which experience and reason show to be most efficient. Attention to the state of the skin and the digestive organs, the use of every means which are likely to improve the general health, give energy to the vascular system, and strength to the muscles; everything, in short, which can corroborate the system at large are the general measures which he recommends as most powerful. Removal to a mild climate either for years, or during several winter seasons, or residence in the country, and frequent and long continuance in the open air, with exercise, constitute also very powerful means of confirming the constitution.

After the formation of tubercles is indicated by the usual symptoms, the principal object must be to control and assuage the catarrhal and pulmonary disorders, which are then both frequent and obstinate. Removal to a mild climate, especially by a sea voyage, should no longer be delayed; and since it is almost impossible always to distinguish between cough and expectoration, which result directly from tubercular softening, and those which are the effect of bronchial irritation, every means should be used by diet, regimen, and medicine, to mitigate the inflammatory symptoms which may give rise to alarm. When consumption is fully established, and when the existence of tubercular cavities is proved by auscultation, no benefit is to be expected from change of climate; and Dr Clark justly dissuades from the measure of adding to the suffering of the patient by the discomfort and fatigue of a long journey.

On another topic, that of the benefit of a sea voyage, Dr Clark is decidedly of opinion that the Atlantic is much safer than the Mediterranean; and between the 25 and 35 degrees of latitude, if possible, the invalid will find the climate best suited to the state of his lungs.

Of the proposal often made and occasionally practised of keeping the consumptive invalid to an apartment artificially heated, and maintained at a regulated temperature, Dr Clark disapproves entirely. Since this practice, he argues, though beneficial to the lungs, is injurious to the general health, it is decidedly improper in the incipient stage of the disease. In the advanced stages, when all hopes of recovery have vanished, he thinks it may tend to prolong life, by preventing causes of irritation. Of course this censure is not applicable to cases of pulmonary or bronchial inflammation occurring during winter, in which there is no alternative but confining the patient to apartments with a regulated temperature till the symptoms have subsided, and the return of mild weather may afford some hope of allowing the patient to visit the open air with impunity.

The general results of the observations of the author will be more distinctly understood from the following short summary:—

" *1st,* That tubercles in the lungs constitute the essential character and immediate cause of consumption.

" *2d,* That tubercles originate in a morbid condition of the general system.

" *3d,* That such a state of system frequently has for its cause hereditary predisposition; in other instances it is induced by various functional disorders; while in a third class of cases (perhaps the most numerous) it arises from the conjoint effects of both these causes.

" *4th,* That consumption is to be prevented only by adopting such means as shall counteract the hereditary predisposition, (where it exists,) and maintain the healthy condition of the various functions from infancy to the full developement of the body.

" *5th,* That in the general disorder of the health which leads to tubercular cachexy,—in tubercular cachexy itself, and even when tubercles are formed in the lungs, unattended with much constitutional irritation, a residence in a mild climate will prove beneficial; and also in cases of chronic consumption, at any stage, when the lungs are not extensively implicated in tubercular disease, and when the system does not sympathize much with the local disorder.

" *6th,* That in cases of confirmed consumption, in which the lungs are extensively diseased, and when hectic fever, emaciation, and the other symptoms which characterize its advanced stages are present, change of climate can be of no service, and may even accelerate the progress of the disease.

" *7th,* That climate, to be effectual in any case, requires to be continued for a considerable time—in most cases for years." Pp. 276, 277.

The next class of diseases in which Dr Clark recommends the sanative influence of mild climate are those chronic affections of the larynx, windpipe, and bronchia, which either resist medical management, or have become inveterate in consequence of neglect or the impossibility of using active medical measures. In these disorders, often connected with extreme sensibility or irritation of the tracheo-bronchial membrane, the author recommends, besides spunging the neck and chest with cold water and the subsequent use of friction, with attention to clothing, the climate of Rome or Pisa, when the cough is dry and the membrane highly irritable, and that of Nice when the disease is attended with copious expectoration. Madeira he regards as more beneficial than any on the Continent for these affections; but much benefit, he thinks, may accrue from spending the summer season at some of the mineral waters formerly mentioned. The springs of EMS on the Rhine, he conceives to be adapted to cases in which the bronchial disease is connected with congestion of the abdominal circulation. In cases less delicate and requiring the tonic effect of mountain air, or those complicated with chronic cutaneous eruptions, BONNES or CAUTERETS are indicated. For the complication with torpor of the habit or of the skin, or repulsion of a cutaneous eruption, the baths of MONT D'OR are represented as most effectual. Their effect may be aided by a previous course of the waters of VICHI. The goat's whey of GEISS is also recommended.

In appropriating its suitable climate to asthma, Dr Clark enumerates four species of this malady; 1*st*, *Pure nervous asthma;* 2*d*, *Symptomatic nervous asthma;* 3*d*, *Humid asthma;* and 4*th*, *Cardiac asthma*, or that complicated with, and probably depending upon, affection of the heart. For the first he recommends Pisa or Rome, and, if complicated with gastritic dyspepsia, the climate of Nice. To most cases of the second he thinks Rome and Pisa also the best. The third is generally most benefited by Nice; and if the fourth is not improved by the same climate, it demonstrates that the primary disease must be more completely subdued.

For confirmed gout, in which the joints are rigid and the general health much impaired, Dr Clark recommends in general the climate of Genoa, in which, during a winter residence, he says, he has seen gouty invalids much improved after they had received no benefit from the south of France. He further impresses on the same subjects the necessity of temperance in diet and the use of wine; and while he advises the moderate use of Bourdeaux, cautions them against that of the spirituous wines of Spain, Portugal, and Sicily. For chronic rheumatism he represents the climates of Nice and Rome as best adapted, —the latter where the disease is connected with gastric irritation of the inflammatory character, the former where it is combined with atony and relaxation of the stomach, and where the disease is complicated with eruptions indicating a cachectic condition of the system, the climates of Nice and Genoa. Both Naples and Pau are unfavourable. The efficacy of the baths of the Pyrenees or those of ISCHIA and LUCCA, of PORRETTA, and of ABANO, &c. in this disorder have been already mentioned.

For improving the health and corroborating the constitution of delicate children, the Italian climate is, according to the experience of Dr Clark, very well adapted; and for such cases, he thinks, Rome and Nice form the best residences,—the former in scrofulous subjects with gastric irritation, and the latter in those of torpid and relaxed habits. For similar cases Sienna or the baths of Lucca or Naples, where sea-bathing may be obtained, form a proper summer residence.

Dr Clark closes his work with some observations on the effects of climates in the premature decay or climacteric disease of old age and the broken health which is so frequently the consequence of long residence in tropical countries. In the first case, the disease often approaches so rapidily that it is impossible for the patient to avail himself of the sanative influence of climate; but where this is practicable, no doubt of its utility can be entertained. For the latter, climate promises a powerful means of alleviation, if not absolute cure,—more especially when the biliary function is much disordered, or the intestinal tube retains the impression of old or repeated dysentery; or, as often happens with invalids from tropical countries, where the lungs are somewhat affected. On these topics Dr Clark gives judicious and useful directions.

On the merits of this work and its great utility it is unnecessary, after the foregoing account of its contents, to dwell. A sentiment already expressed in the course of these observations, that it contains information of the utmost importance to invalids of that description who require change of scene and change of climate, we must repeat and impress particularly. It is written with so much simplicity and judgment, that every part of it almost is intelligible to the general reader; and it is by no means the smallest recommendation of this work, that information which it has cost the author years of patient and sedulous observation to acquire, is compressed into such a space, that the volume may form a convenient travelling companion in the most slender equipage.

ART. II.—*Beiträge zur nähern Kentniss der Wuthkrankheit, &c.*

Contributions towards a better Knowledge of Rabies Canina. By Dr HERTWIG, Veterinary Physician, and Lecturer in the Royal Veterinary School at Berlin. (Published in a Supplemental Number of *Hufeland's Journal der Praktischen Heilkunde.* 1828. Pp. 173. duod.)

THE object of the treatise of Dr Hertwig is to determine, more precisely than has hitherto been done, the symptoms and morbid appearances of Canine Madness,—the diagnosis between the disease as it occurs in the dog, and the other diseases of that animal, which from their resemblance are apt to be mistaken for it,—and the chief circumstances connected with its transmission from one animal to another.

The earlier numbers of the Medical and Surgical Journal contain several full analyses of various inquiries which have been published of late years on the subject of Rabies. These works relate chiefly to the symptoms which the disease induces in man, the questions regarding its origin in inoculation and the possibility of its arising spontaneously, the pathology of the disease in the human subject, and the relative success of the numerous methods which have been proposed for its treatment. On these topics Dr Hertwig does not profess to be able to communicate any thing new, and consequently he has passed them over altogether. In the works in question, however, we shall in vain look for precise and minute information on the phenomena presented by the disease in the dog, or on the circumstances relative to its transference by inoculation or otherwise from one animal to another. Nevertheless these are departments of knowledge, with which, though strictly belonging to veterinary medicine, it is of essential consequence that the medical practitioner be well acquainted; as he is not unfrequently appealed to on the part of persons who have been bitten by dogs, and is required to determine the state of health of the suspected animals. It is to be feared that few practitioners are qualified to undertake this important task; nor is their incompetency at all wonderful, considering the vague and contradictory accounts which have been given by different writers of the symptoms of rabies in the dog. These imperfections of diagnosis are mainly owing, as our author clearly points out, to other diseases having been confounded with rabies, and described under that name. But they have also partly arisen from the disease really presenting itself under different forms, which, in investigations on the limited scale to which prior inquirers have confined themselves, are apt to escape notice. The diagnosis, however, is not the only point relative to canine madness where obscurity and uncertainty prevail. The inquiring eye of scepticism has been extended even to the most primitive and fundamental doctrines regarding this mysterious malady, and some have gone so far as to call in question the possibility of its being communicated from one animal to another by inoculation; nay one rash speculator has professed his disbelief in the most unequivocal manner, by performing inoculation with rabid matter on himself.

For the purpose of investigating these and other points connected with Rabies, a series of experiments was planned some years ago at Paris under the sanction, and we believe at the request of the government; and the experiments, of which we had the good fortune to witness several, were actually commenced under the direction of a well known anatomist. We have not been able to learn whether the inquiry was persevered in; but the results have never been made public. Meanwhile another set of observations and experiments were also instituted for the same purposes in the Royal Veterinary School of Berlin, at the suggestion of Dr Langermann its director; and they have been carried on with indefatigable zeal by Dr Hertwig for upwards of five years, during which period no less than 300 cases of rabies came under his notice, and above fifty experiments of inoculation were tried. The present work is the result of these extensive researches.

The treatise consists of a simple enumeration of facts described with simplicity, and generalized with caution. And if we may be allowed to judge of the whole from the parts of which our own small experience has enabled us to form an estimate, the minuteness of the author's observation, and the accuracy of his description, are only surpassed by the vast extent of his opportunities. We have no doubt, therefore, that his statements may be received with perfect confidence.

After a brief historical notice of the progress of our knowledge of Rabies, as a department of the veterinary art, and an introductory account of the different alleged varieties of the disease, Dr Hertwig proceeds to describe it as occurring in two forms, that of Raging rabies, *(rasenden Wuth,)* and that of Calm rabies, *(stillen Wuth ;)* he then details the morbid appearances he has found in the bodies after death ; he next draws the distinction between rabies and the other diseases of the dog which are apt to be confounded with it ; he afterwards relates in succinct, but comprehensive terms, several cases of the two varieties of the disease ; and he concludes with a statement of his experiments of inoculation, and of the general inferences to which they lead. We shall present a short view of what he has brought forward under each of these heads.

Many people, he says, conceive that canine madness is announced by certain precursory symptoms, such as unusual irritability, or sluggishness, increased warmth of the point of the nose, increased sparkling and redness of the eyes, enlargement of the pupils, retraction of the lips, bristling of the hair, and the like. But although he was always on the watch for such warnings, he was very seldom able to observe them. When symptoms of the kind were unequivocally present, other symptoms also existed, and the disease was in reality fully formed.

The first symptom of the *Raging* form of rabies is a change in the behaviour of the animal, sometimes dulness, sluggishness, and peevishness, sometimes, on the other hand, increased sensibility, activity and serviceableness, with a disposition to anger ; and the change of temper, whatever it may be, is not permanent but intermitting.—A very common symptom at the beginning is a great disposition to lick cold objects, such as a chain, stones, heads of nails, the noses of other dogs, and the like.—Restlessness is also a very common early symptom. In its slightest degree this is manifested in frequent shifting of the place where they lie, and a tendency to go often towards the door, without an object ; in its highest degree it impels the animal to run off to a considerable distance in the neighbourhood, sometimes for a whole day ; but it always returns home if permitted, and there takes pleasure in recognizing its acquaintances. The degree of restlessness often depends on the usage which the dog receives at home.—A rabid dog never loses its intelligence entirely till it is near the point of death. All know their master or keeper, and obey him more or less, but less and less as the malady gains ground; and those which have been taught tricks will for some days perform them when told. No mad dog is completely disobedient to his master, but becomes more and more so the more the disease advances, and the more he is irritated.—Loss of appetite is a very early and nearly invariable symptom. A few will take throughout even their whole illness a little soup or a morsel of soft bread or flesh. But by far the greater number refuse food entirely at an early period, and many of them even two days before any other symptom of note would be remarked by a careless observer. This is a striking character of rabies; for in all other diseases of the dog, the appetite does not fail till the disease is fully formed, or at least is obvious to an ordinary observer.—Loss of appetite is almost invariably accompanied with a propensity to eat indigestible substances, such as straw, leather, wool, fragments of wood, turf, and glass, and also to swallow their own urine and dung, as well as those of other dogs. This depraved appetite is very rare in other diseases, and is an important criterion, since it is applicable both during life and after death.—A few rabid dogs do not suffer from thirst, and therefore do not care for water; but the greater number lap and swallow it during their whole illness, and many of them greedily; some lap it frequently, but cannot swallow it properly, because the tongue or throat is swollen. But no rabid dog dreads water. This is not a new observation; for *Meynel*,* *Blaine*, † and *Greve* ‡ have made the same remark. It does not the less require repetition, however; because not only the vulgar, but also many medical men, and even some late authors, such as *Waldinger*, § continue to fall into the old error of supposing that canine madness is accompanied with hydrophobia.—Neither does any rabid dog dread the light or the air as some erroneously imagine. A few animals have an increased sensibility to bright light, and on that account prefer an obscure place and wink when the light is vivid; but none can be properly said to have an aversion to light.—All have a tendency to constipation.—The most important and invariable symptom of all is a change in the cry. The tone is sometimes higher, sometimes lower than natural, rough, hoarse, and expressive of anxiety. The animal does not give utterance, as in health, to a rapid succession of short, distinctly separated barks; but to a single short bark, which is suddenly changed to a short howl. The sound is neither a bark nor a howl, but something intermediate between both, and so remarkable that no one who has heard it once can fail to recognize it again. In no other disease does the cry of the dog undergo a similar change; and hence in cases otherwise doubtful, Dr Hertwig has often decided that rabies was present from the cry alone, and he never was wrong in his decision. Our attention was pointedly called to the peculiar cry of the dogs affected with rabies in Paris, and, like our author, we conceive it is quite peculiar to this disease, and so marked that no one who has heard it once can fail to recognize it again, or to distinguish it amidst those of many healthy dogs barking at the same time. In many cases the animal cries without any apparent cause, in others only when it is irritated.—In most dogs affected with raging rabies a disposition to bite is manifested in a greater or less degree. This disposition is not constant, but occurs only at intervals. It is also very different in degree, according to the race, temperament, and habits of the animal. Mild-tempered and phlegmatic dogs sometimes only snap, or push or pinch with their teeth, without actually biting. Furious dogs, and those accustomed to fight or to kill vermin, exhibit on the contrary an ungovernable propensity to tear and slaughter all living things that come within their reach, or even to destroy inanimate objects, and to lacerate their own bodies. The propensity to bite is increased in all by irritating them. Cats are the first animals they attack, then their own kind, then other animals, and lastly man. When they come in contact with other dogs they first snuff at them, particularly about the snout and genitals, wagging the tail all the time, and then bite quite unexpectedly. The bite is seldom preceded by snarling or accompanied by a growl.—Many rabid dogs snap frequently at imaginary objects in the air.—Their external appearance is at first little altered. On the second or third day the eyes usually become somewhat reddish, and the eyelids are closed from time to time for a few seconds, as also happens with dogs that have the distemper or catarrhal affections. At the same time the skin of the forehead is drawn down over the eyes in small wrinkles. At a later period the eyes are dull and muddy, but never more fiery or lively than at the beginning. In many instances the whole head swells, in others the nose or tongue only. Most have a rough appearance; and all become rapidly very lean.—The muzzle in Raging rabies is generally rather dry than moist, and therefore without froth or slaver, which is commonly supposed by the vulgar to indicate the disease. The surface of the lips and tongue is sometimes very dry. Salivation is observed only in the rare instances where there is considerable swelling of the pharynx, and consequently difficulty in swallowing.—Another common error is to suppose that the tail is always held down between the legs. On the contrary, it preserves its usual position till the animal becomes very weak, and then it hangs down flaccid.—In like manner the gait is at first unaltered. But as the disease advances, the hinder part of the body becomes gradually weaker and weaker, and at length the hind legs are completely paralyzed.—It is an error to suppose that mad dogs always run straight forward. At first they run about snuffing and following the scent in various directions; and when the biting-fit comes on they turn aside in quest of objects. It is only when the disease is in its advanced stage, and the animal's intelligence blunted, that it runs straight forward.

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* Trans. of a Soc. for Med. and Chir. Knowledge, Vol. i.

† Canine Pathology, or Description of the Diseases of Dogs, 1817.

‡ Erfahrungen und Beobachtungen über die Krankheiten der Hausthiere, 1818 and 1821.

§ Ueber die in den Jahren 1814 and 1815 haüfiger beobachtete wuth der Hunde. In der Mediz. Jahrbüch, des K. K. Oesterreich. Staates III. iii. 89.

In the *Calm* form of Rabies a change of behaviour is remarked as in the former variety; and for the most part the animal becomes inactive, listless, and sorrowful. The most striking and important symptom of this variety is paralysis of the lower jaw, so that the mouth is constantly more or less open. The dropping of the jaw has been ascribed by some authors to spasmodic contraction of the muscles which open it. But this is an erroneous idea; the real cause being a paralysis or weakness of the muscles which close the jaw, as may easily be seen from the facility with which the jaw can be raised with the finger so as to close the mouth. The paralysis is different in degree in different cases: Some dogs cannot shut the mouth during their whole illness or under any circumstances; while others, when excited, can close it for a few seconds so as to bite. The palsied state of the jaw prevents them from swallowing, so that the fluids which they lap run out by the corners of the mouth, and the saliva also commonly flows out in the same manner. The tip of the tongue often projects a little between the teeth. Animals affected with the calm form of rabies have much less propensity to bite than those who have it in the raging form; and they have also less tendency to change place or run away from their home. Their cry is changed precisely in the same manner; but it is much more seldom heard; and some dogs do not cry at all. In all other respects but those now mentioned, the symptoms of the calm and raging varieties are the same.

The course of the disease differs considerably. Death is commonly preceded by gradual exhaustion of the strength; and it is inevitable. From six to eight days is the ordinary duration; but some animals die sooner and others live ten days. Dr Hertwig never saw an instance where the animal survived that period.

The history of which we have here given an abstract, agrees in most particulars with an account published a few years ago by Mr Youatt, a veterinary surgeon of London, (Lond. Med. Repos. 1826, ii. 448,) but is much more full and complete.

The *Morbid Appearances* laid down by our author are the result of nearly 200 dissections, in which the precaution was frequently taken of examining at the same time, as a point of comparison, the collateral appearances in a healthy dog. The result is equally unsatisfactory with that at which other observers have arrived in endeavouring to ascertain the pathology of the disease as it occurs in man. " Although," says Dr Hertwig, " I have witnessed in particular cases every appearance which prior observers have seen and recorded, I must nevertheless confess, that with all the pains I took I have been unable to discover any constant change of structure or one peculiar to Rabies, and that, like the symptoms during life, the appearances after death are very different in their variety, extent, and intensity."—" Notwithstanding all this, however, the data derived from the inspection of the body are of great importance, and it is quite possible to draw from them a correct conclusion on the question as to the pre-existence of rabies."

The subcutaneous veins are full of black, tarry blood. The brain and spinal chord, as well as their membranes, are turgid with blood. The muzzle is sometimes a little swelled about the lips. The tongue in general is not swollen ; nor are any vesicles, tubercles, or scars to be seen under it ; but its surface is covered with a dirty, dryish slime. The salivary glands are yellowish, not swelled or turgid with blood. The fauces are abundantly covered with tough mucus, which extends into the nostrils ; the pharynx contracted, and commonly moist and white, sometimes, however, a little swelled and reddened ; the gullet natural. The stomach is in general more diseased than any other organ. Its outer surface is usually dark red, its inner surface, particularly near the pylorus, dark, sometimes cherry-red, often looser and thicker in texture than natural ; and it contains either a yellow, green, or reddish mucus, or more frequently various indigestible substances, both hard and soft, such as wood, stones, sand, leather, wool, fragments of cloth, straw, and the like, but very rarely any food. In the intestines, and especially in the duodenum, are often seen dark spots externally, and red patches internally, as in the stomach ; yet not unfrequently the intestines are quite healthy in appearance. The omentum, mesentery, liver, pancreas, spleen, kidneys, supra renal capsules, bladder, blood-vessels and nerves are free of disease. The larynx, and more particularly the epiglottis and ventricles of the glottis, are often red, but sometimes not ; the windpipe and its ramifications are in like manner sometimes red from increased vascularity, at other times not altered from their natural state; and the lungs are in general much loaded with blood, sometimes inflamed in patches. The heart is commonly flaccid, the pericardium healthy, and the great vessels also in the natural state. The eighth pair of nerves, the great sympathetics, and the phrenic nerves are not affected.

In establishing the diagnosis between rabies and other analogous diseases in the dog, Dr Hertwig passes in review the following disorders—the *Distemper,—Inflammation of the Stomach and Bowels,—Constipation,—Inflammation of the Larynx and Windpipe,—Foreign bodies in the Throat,—Fracture and Dislocation of the lower Jaw.*

The *Distemper* is a catarrhal affection, indicated at the commencement by lacrymation, sneezing, discharge of mucus from the nose, and fever; and in the latter stage by tetanic paroxysms. "These paroxysms, but particularly the spasmodic chewing which often attends them, and which the ignorant mistake for a desire to bite, together with the frothing and slavering from the mouth, and the bewildered roaming of the animal, give it a very suspicious and much more frightful appearance than rabies itself, with which some ignorantly confound this disease. It is distinguished from rabies by the spasmodic fits which never accompany the latter malady, by the excessive slavering and insensibility which attend the fits, and by the want of the most striking symptoms of rabies, such as the peculiar cry, the propensity to bite, and the palsy of the lower jaw."

Inflammation of the Stomach and Bowels, which is usually caused by cold, by poisons, or by foreign indigestible substances, is distinguished by vomiting of ingesta, sometimes accompanied with blood,—by the stiff position and wearied, melancholy appearance of the body,—by the unnatural heat of the belly and the loud cries of the animal when the belly is touched,—by its listlessness,—by the want of the cry of rabies, or the disposition to bite, or the tendency to swallow indigestible substances, or the palsy of the lower jaw.

Constipation, when it has lasted some time, induces an excessive restlessness and a disposition to bite when the animal experiences or dreads rough handling; and these symptoms have led to the affection being confounded with rabies. But it may be at once distinguished by the frequent efforts which the animal makes to discharge feces, and by the unaltered sound of its cry.

Inflammation of the Throat, the consequence of catarrhal affections or of mechanical injury of the root of the tongue, pharynx or larynx, bears a closer resemblance to rabies than any other disease. The animal loses its activity, acquires an anxious look, and hangs the head stiffly. The eyes are sometimes red and irritable, the nose hot and dry, the inside of the mouth and the tongue red and dry, and covered with an abundant tough mucus. The throat externally is swelled more or less, and always tender to pressure; and in consequence of the swelling the lower jaw is often kept open. The cry is a short hoarse bark expressive of pain and not terminated by a howl; and it is rarely uttered except when the animal is irritated. It may be distinguished from rabies, to the calm form of which, however, it bears a very close resemblance, by examining attentively the lower jaw. In Rabies the jaw can be very easily closed by supporting its weight; in inflammation of the throat this cannot be done either so easily or so completely. In Rabies the jaw may be thus closed without hurting the animal; but not in inflammation without exciting expressions of pain. In Rabies the jaw remains immoveable so long as the animal is not irritated; in inflammation its position varies, being at one time more closed than at another.

The *presence of Foreign Bodies* sticking in the mouth between the teeth, or in the fauces or gullet produces a sorrowful expression, much restlessness and frequent crying, scratching of the mouth with the fore feet, rapid breathing, and much slavering. When the body is sticking in the mouth, the animal cannot shut the lower jaw completely; when it is in the throat, frequent efforts are made to dislodge it. These two circumstances will lead an accurate observer to suspect the real cause of illness and the exact position of the foreign substance.

Fracture and Dislocation of the lower Jaw give the dog in many respects the appearance of Calm rabies, for the mouth is constantly open, the saliva issues from it in abundance, and the animal can neither eat nor drink well. At the same time the countenance is much altered and expresses anxiety and pain. The diagnosis is to be formed by attending to the swelling and tenderness around the injured part, and to the crepitus on motion in the case of fracture, and the impossibility of closing the jaw in the instance of dislocation.

On the whole, it appears that with a moderate share of knowledge and due caution very little difficulty ought to be experienced by any one, in distinguishing Rabies from any of the diseases which bear a resemblance to it in external characters.

It appears to us unnecessary to follow the author through the next division of his treatise, in which he relates the heads of several cases of the two varieties of rabies in the dog. The cases are requisite to enable the readers of his essay to judge for themselves of the accuracy of the general summary and conclusions; but they cannot be transferred to our pages without disproportionate details. We shall therefore pass to the last subject, the circumstances connected with the origin of the disease in the dog. This subject has been investigated experimentally by Dr Hertwig with great assiduity and success.

Both forms of it he has frequently seen to arise spontaneously. The causes of its spontaneous origin are very obscure; for it appears in dogs of every race and of all ages, under every species of management, at all times of the year, and in every kind of weather. Individual disposition to disease is therefore probably an important circumstance among the causes of its production; and it appears that those dogs are most subject to it which have suffered most from the distemper and its various nervous sequelæ. Among the most influential causes, may certainly be ranked a highly excited and ungratified sexual desire. Heat and cold, which are vulgarly supposed to be intimately connected with its appearances, have really no connexion with it whatever; for Dr Hertwig has found that the disease is not more frequent during or after very cold winters and warm summers than at other times, and that it is much less frequent among carriers' dogs and barrow dogs,* which are much exposed to the extremes of weather, than among chamber dogs, which are most protected from them. Among the innumerable multitude of dogs used in and about Berlin for drawing milk barrows, and which are exposed to inclement weather of every kind throughout the whole year without any shelter whatever, he has witnessed only one case of rabies in five years.

But by far the most common cause is contagion or inoculation. Some persons have doubted the truth of the vulgar notion, that rabies is propagated by the bite of rabid dogs; and not long ago Mr White, a surgeon in the south of England, was so confident of the incorrectness of this doctrine, that he allowed himself to be bitten by a mad dog. Although his rashness was crowned with a success which, we had almost said, he little merited, it will be easy to explain the result, from what is now to be mentioned on the authority of Hertwig, without our being reduced to the necessity of denying the contagious nature of the disease.

Of fifty-nine inoculations, some of which were performed with the saliva introduced either expressly by a wound, or in the usual way by a bite, and others were attempted by the injection of the blood of rabid animals into the cellular tissue under the skin, Dr Hertwig found that fourteen, or *about twenty-four per cent.*, caused true rabies. As these experiments were commonly made in the most favourable circumstances for the poison taking effect, it follows that the old established doctrine is true, —that the disease is not always propagated in every possible case. This may sometimes arise from the poison being washed away by free hemorrhage from the wound, sometimes from the bite having been inflicted through several folds of clothes, or through a closely set, hairy hide, or through a thick cuticle, or on parts where absorption is carried on imperfectly. But very many cases of the failure of the inoculation cannot be thus accounted for; and no other way remains of accounting for them, except by supposing that the poison cannot take effect without some peculiar capability or *diathesis* existing in the constitution. This diathesis may exist in very different degrees. Many of the animals inoculated by Dr Hertwig were infected by the first inoculation; others, though inoculated under circumstances apparently almost the same, were not infected till the second, third, or fourth trial; and one dog, *a terrier four years old, was inoculated nine times in the course of three years without taking the disease*, while seven other dogs took it who were inoculated on different occasions along with it. Hence, when a doubt exists in any special case as to the nature of the illness of a dog which is considered mad, one or two accidental or intentional inoculations may decide the question in the affirmative, if one or both of the inoculated animals take the disease; but cannot decide it in the negative, although these animals should escape.

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* Both in Berlin and in Paris dogs of various large breeds are used in great numbers for drawing barrows and little carts in the streets. This practice is almost entirely unknown in our country.

The contagion of rabies appears to belong to the *Fixed* species; for our author was never able to produce it by exposing healthy dogs to the exhalations from rabid animals, or in any other way except by inoculation. But it may be produced by various fluids from the body of a diseased animal. *M. Trolliet*, a writer with whom Dr Hertwig does not appear to have been acquainted, has supposed that the fluid by which rabies is communicated is not, according to the vulgar notion, the saliva, but the mucus secreted by the larynx. Dr Hertwig, however, seems to have established the reverse; for he found that the disease was communicated not only by the *bave* or foam in the mouth, but likewise by the saliva gathered from the ducts by compressing the salivary glands, and even by fragments of the salivary glands themselves. Nay, he also found that the communication of the disease might be effected by the blood,—two dogs out of eleven that were thus inoculated having died of rabies.

The contagion may be communicated at all periods of the disease, and even for some time after death. In several instances, it was produced by inoculation with the froth of the mouth collected in the dead body. It never appeared, however, to be induced if the matter was collected later than about twenty-four hours after death.

The contagion takes place only when the matter is introduced into the system through a wound of the external surface; for it was found by many experiments impossible to impart the disease by making dogs swallow large quantities of the diseased matter. But a bite is not necessary. The disease may be communicated quite as well by applying the matter to a common wound. It is clear, therefore, that the production of hydrophobia in man is the effect neither of the peculiar kind of wound, nor of terror, but is owing to a peculiar virus.

It was maintained by a German writer of the last century,* and has been very lately asserted by an Italian author,† that rabies is not contagious in the second generation,—that animals affected by inoculation, from a dog in which it arose spontaneously, are incapable of communicating it in their turn. This supposition Dr Hertwig contradicts by many experiments. In one instance he communicated rabies to a dog with the saliva of a man who died of hydrophobia; and this dog communicated it by biting two other dogs.

The morbid matter produces in the dog no perceptible effect, either local or general, till the malady breaks forth. The case may be different with man. But certainly in the dog no change whatever is observed till the disease begins; and in particular the wound heals like other lacerated wounds; nor is there ever found under the tongue any vesicle or pustule, such as Marochetti has described.

The disease breaks out in the dog within fifty days after the inoculation. Dr Hertwig never witnessed it after a longer period. It does not always assume in inoculated animals the same form as in the animal from which it is communicated: Each variety may produce the other.

There is no peculiarity in the effluvia of rabid dogs which leads other animals of the same species to shun them, nor are healthy dogs averse to come in contact with them. On the contrary, they allow rabid dogs to approach them without fear, and snuff at them, and are snuffed at in their turn, without exhibiting any sense of fear. Healthy dogs are also not afraid of the carcase of a rabid dog, as is often imagined.

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* *Bader*, Neue Theorie der Wasserschen. Frankfurt, 1792.

† *Capello*, Memoria sull' Idrofobia. Roma, 1823.

ART. III.—*Chirurgische Erfahrungen, besonders über die Wiederherstellung Zerstörter Theile, &c.*

Surgical Observations, particularly on the Restoration of Mutilated parts of the human body, according to New Methods. By Dr J. F. DIEFFENBACH of Berlin. With two Lithographic Plates. Berlin, 1829. Pp. 102, 8vo.

THE observations, of which it is proposed to give here an analysis, consist of a numerous collection of cases illustrating the mode of restoring portions of the external parts of the body, which have been more or less completely destroyed by disease or accident. The treatise contains six essays. In the first, Dr Dieffenbach treats of the restoration of the nose, and describes a new method by which he has succeeded in restoring it when partially or entirely lost. In the second, he describes a method of forming new lips, when these have been destroyed by disease, and have induced excessive contraction of the mouth. The third treats of the restoration of the velum of the palate; and the fourth of the restoration of the prepuce. The fifth is an elaborate and full account of several cases of the operation for healing lacerated perineum. The sixth and last contains a short account of an attempt to renovate a portion of the urethra, in a case where a considerable gap had been produced after stricture. The whole work is full of interest to the operating surgeon, on account of the ample list it contains of well-described and instructive cases. It likewise displays much originality on the part of the author in the conception and conduct of operations, and shows how certain important operations may be performed by new methods, which are likely to extend the boundaries of operative surgery, and to add to some of its branches increased facility of execution and probability of success.

The first and most material of the essays, of which Dr Dieffenbach's work is composed, relates to the operation for Restoring the Nose when mutilated by disease or accident. It is well known to every surgeon that two methods have been lately practised for the restoration of the nose. One of these, for the introduction of which into European practice we are indebted to Mr Carpue, and which was derived by him from the practice of the native operators of the East Indies, consists in forming the new nose with a piece of the integuments of the forehead immediately above the root of the nose. The other, which has been adopted in recent times particularly by Graefe of Berlin, is the method of Tagliacozzi, who formed the new nose by transplanting a part of the patient's arm. Dr Dieffenbach, while he admits that some good noses have been manufactured by both of these plans, and more particularly by that of Tagliacozzi, maintains also that many of the new noses constitute a deformity hardly less repulsive than that which they were intended to remedy. This result, indeed, he allows may be partly imputed to the operator not having previously studied the art of forming a natural-looking nose, the modelling of which in skin must be considered as not less difficult or more likely to be learned without study, than the modelling of a well-proportioned nose in clay. But after making allowance for this explanation, some share of the failure will still remain to be ascribed to the defective nature of the operation itself. Thus he remarks with regard to the Indian method, that although noses made in that way are often natural enough in appearance at first, they not infrequently lose their form in time, apparently because the edges of the wounds in the cheeks, on which the new nose is engrafted, approach one another, so that the base or foundation of the nose becomes thin, while the dorsum and tip continue broad, and consequently appear swelled. As to the Taliacotian method, it is subject to the inconvenience of the nostrils having a tendency to close; and besides, the artificial *alæ* are generally too thick. To the Indian method he farther objects, that the scar on the forehead is sometimes so great a deformity, that the improvement of the nose is by no means cheaply purchased.

The plan which he proposes to follow varies with the particular kind of mutilation which the nose has sustained. In some circumstances he adheres to the Taliacotian method, with certain improvements to be mentioned presently in the mode of engrafting the new nose on the incisions in the face, and also in the mode of dressing the parts. But in other cases he proposes to depart entirely from the methods at present followed. He observes that in many of the worst cases of disfiguring of the nose,—produced by the destruction of the nasal bones, the cartilages, the *septum*, and turbinated portions of the ethmoid bone,—the external soft parts, or dorsum, tip and cutaneous septum of the nose, have merely sunk deep into the cavity left by the removal of the bones which supported them, and are not destroyed along with these bones, though not infrequently they are somewhat shrivelled or contracted. In such cases, the restoration of the nose may be effected by raising up the sunken parts of the organ, and placing them in a position approaching to that which they formerly occupied. Proceeding from this idea, he subsequently devised and executed the following method of operating in cases of the kind alluded to.

" The patient being placed on a chair, behind which an assistant holds the head steady on his breast, the operator thrusts a small pointed scalpel into the left side of the cavity before the sunken point of the nose, and by an incision proceeding obliquely upwards, cuts through the soft parts as far as the nasal process of the frontal bone. A similar incision is then made on the right side. The strip of integuments between these incisions, which consists of the point and dorsum of the old nose, is twice as broad below as above, where it is attached to the skin of the forehead. At the lower end it is connected with the upper lip only by the shrunk cutaneous portion of the septum. If this is destroyed, the flap may be at once raised and reflected, in order to procure room. The inverted tip of the nose which forms the extreme point of the flap is next to be pressed outward. The shortened septum is then also elongated to the required extent, by an incision made on each side of it in the upper lip.

" The next step is the formation of the sides of the nose. The first incision is most conveniently commenced on the right side of the face ; the knife is inserted down to the bone, a few lines deeper than the termination of the incision by which the *dorsum* of the nose was raised ; and it is then carried in a long stroke through the whole soft parts obliquely downwards on the line where the base of the nose passes into the integuments of the cheek,—a small addition from the latter being advantageous. A similar incision is then made on the left side. Lastly, two semicircular incisions are to be made through the soft parts, along the natural (though in the present instance entirely obliterated) place of insertion of the *alæ nasi.* Both the left and right of these incisions pass round the lower part of the sunken *alæ,* outwards and upwards into the incisions at the side of the nose. In some places the lower edges of these flaps are already free. They are to be laid hold of with the forceps, and cautiously separated from the bones, when at length the *alæ* will be seen at their lower parts, and may be drawn out of the cavity and reflected upwards. These flaps extend to the skin of the forehead, towards which they become gradually less and less in breadth.

" The subsequent step of the operation, and a very necessary one, is the separation of the margin of the incision in the integuments of the cheek to the distance of a fourth or a third of an inch. It is by means of this separation that a firm attachment is procured of the skin (forming the sides of the new nose) with the facial bones at the base of the nose, and that consequently the nose is prevented from again sinking down by a sort of slipping outwards of its sides, especially at the upper portion. This mutual approximation of the sides, which will be again spoken of presently, is principally accomplished by means of two long needles, which are passed through the edges of the integuments of the face, under the base of the nose, and are fixed, in the way to be described afterwards, to a long splint of stiff leather placed on each side of the nose, so as to squeeze the nose outwards by pressing on its base.

" The operator will now proceed to the re-construction of the nose. If the flaps were brought in contact by their former incision surfaces, the nose would not sink down again, but would be very flat. Their edges must therefore be cut in such a manner as to promote the upright position of the nose. For this end the inner part of the two edges of the dorsal flap is to be cut away with a pair of sharp scissors, without comprehending in the incision any of the cuticle of its outer surface ; so that the fine strip of skin removed has a triangular form. The reason for this procedure is obvious. The dorsum of the nose acquires in consequence the properties of the key-stone of an arch ; it half rests on, and half lies between the edges of the external flaps. In order to prevent the strong inclination of the lateral flaps and *alæ nasi* inwards, and to raise them up like walls, their external edges too must be cut,—not, however, on the inner angle of the edge, as in the instance of the dorsal flap,—but on the outer or epidermal angle. On the straight lateral edges this is done with a pair of straight scissors, on the edges of the *alæ* with a pair of scissors curved on their surface.

" The union of the flaps with one another, and with the skin of the cheeks, is next begun. In the first place, the edges of the dorsal flap, after the careful removal of the blood, are united with the upper (inner) edges of the lateral flaps. The best mode of accomplishing this is by the twisted suture. Three needles are sufficient for each of the upper seams ; and they must be placed at proper distances from one another. The two lowest should be at the sides of the tip of the nose. The union is more complete when another needle is introduced into the outermost edge of each *ala*. Finally, another ligature is drawn through the edges of the part of the upper lip from which the septum was taken. Thus this ligature lies behind the septum ; and while it brings the edges of the breach in the lip closely together, it contributes to push the strip of integuments forward, and prevent it from sinking back into its former cavity. All the needles after being properly furnished with ligatures should be cut off close to the thread. If the septum is altogether wanting, it is formed at a later period, after the other parts are fully healed,—by cutting a small strip of skin out of the upper lip, and bringing it into contact with the tip of the nose, where a raw surface is previously made for its reception. The union of the nose with each of the basement edges of the cheek is effected by four simple knotted sutures, which are introduced by fine, semicircular, sharp stitching needles. The two uppermost serve to fasten the lateral surfaces, the two lowest to fix the alæ to the upper lip.

" The last step in the operation is the insertion of two long needles under the nose, and through the detached edges of the integuments of the cheek. They are thrust from the left towards the right side ; and their entrance and exit are about an inch distant from one another. Before they are introduced a strip of stiff leather, from a third to half an inch in breadth, and from one and a half to two inches long, is laid on each side of the nose; and each of these compressing splints has two small holes through which the needles are to be passed, on the left side *before,* but on the right side *after*, they have transfixed the nose. The heads of the needles on the left side prevent them from slipping through the leather; and this is prevented on the right side, and the base of the nose at the same time squeezed inwards to the requisite degree by twisting the projecting points of the needles spirally with a pair of pliers. The whole nose, but particularly its cavities, must then be carefully cleaned by injections of tepid water; and quills wrapped round with oiled charpie are to be introduced into the nostrils." Pp. 9—14.

Dr Dieffenbach then proceeds to describe shortly the after-treatment, which is exceedingly simple. He recommends at first the use of an embrocation of warm wine and water, till the commencement of the inflammatory process, when Theden's lotion much diluted becomes necessary. At a later period lotions of the acetate of lead are required, particularly where any part of the wounds has suppurated. During the night the nose should be covered with a fine pledget dipped in oil. By these means, he says, the whole process may be finished in eight days. On the third day some of the needles and lateral ligatures may be drawn out, those only being left which have most to hold. More of them may be withdrawn on the fourth, and the remainder on the fifth. On the third day, too, a cautious attempt may be made to withdraw the quills from the nostrils, which are then to be gently cleaned by injections. Tents of oiled charpie are to be substituted for the quills, and fresh ones introduced every day. The two long needles thrust through the base of the nose should not be removed till the eighth day. In their stead two others should be introduced at two different places, and left for eight days more; and this precaution may with propriety be repeated a third time. In order to promote the thickening of the nose, as soon as the inflammation has entirely subsided, the inner surface of the nostrils should be touched daily with caustic; and afterwards granulation is to be encouraged by sprinkling red precipitate on them with a hair pencil. Tents moistened with sugar of lead will be then found to promote greatly the internal cicatrization.

After this description several cases are given which illustrate the principles developed in the preceding narrative. Most of these were cases where the nose was only in part wanting, having been mutilated either by disease or by external injuries. One, however, which will be here shortly noticed, was an instance of restoration of the entire organ. This was in the case of a girl twelve years old, who, in consequence of a tedious fetid suppuration of the nose, had lost the ossa nasi, the nasal processes of the maxillary bones, the turbinated processes of the ethmoid bone, and the cartilages, so that the soft parts had sunk down, and instead of a prominent nose, there was as it were a deep pit, with a ridge in the bottom of it, and a furrow on the middle of the ridge. Her countenance had a most repulsive appearance, being liker that of a death's head than the face of a living person. She had been for three years in a state of good health. The incisions being made as formerly described, the buried nose was gradually dug up. The tip, which had been turned inwards, was found when turned out to adhere to the lip by a shortened septum. When the central and lateral flaps were united by the sutures,

> "The nose stood up exactly like a natural nose. It appeared so solid that no fear was entertained of its sinking again: The sutures and the peculiar mode of cutting the edges of the incisions gave it support. As the old *septum nasi* appeared too short, it was elongated by means of two small incisions in the upper lip." *
> * * * "Immediately after the operation the nose had a pale appearance, and felt very cold; on account of which I ordered a mixture of tepid wine and water as an embrocation. Even so early as the evening of the same day the vital turgor returned with redness and warmth; and the external appearance of the nose was improved. Next morning the redness had increased, and was attended with some swelling. All the wounds lay in close contact, and justified the strongest expectations of ultimate success. The patient's general state, however, was not so good as might have been wished. She had passed a restless night; and had suffered much from stitches in the chest, oppressed breathing, cough, and fever. Twelve leeches and the antiphlogistic regimen were accordingly ordered; and in the evening the pulmonic symptoms were much better. The external appearance continued good. As no farther means were required to maintain the vitality of the parts, the warm fomentations were abandoned, and lead lotions substituted.
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> "The union of the flaps of the nose with one another, and with the cheeks, was on the third day so decided, that I was able to withdraw most of the needles, and some of the knotted sutures. The septum alone had a bluish colour. I now, by injecting warm water, loosened the quills which were firmly fixed by clotted blood, then cleaned the nostrils properly, introduced two tents of oiled charpie, and covered the whole nose with embrocations of lead lotion and elder infusion. On the fourth day the septum was entirely lost; on which account the shred was cut away with the scissors. Its loss was indeed almost inevitable, as it was too thin, being not larger than a pigeon's quill.

"In a few days more the swelling of the nose had entirely disappeared, and its appearance was much improved. On the tenth day the long compression-needles were withdrawn from the edges of the incisions in the cheeks; and two other needles were thrust through the upper and lower parts of the nose, with the same precautions as before. Two others were introduced eight days after that to replace the second set. During the whole period of the treatment the inner surface of the nose was diligently irritated, in order to promote granulation and thickening of the soft parts. The formation of the inner integuments was rapidly accomplished by the frequent injection of lead solutions. I propose next to proceed to form a proper septum, for which purpose recourse will be again had to a slip of the skin from the upper lip." Pp. 28.

The Second Essay of Dr Dieffenbach is an account of an operation for remedying a deformity which may have been not very uncommon in former times when it was the practice to treat syphilis and other diseases by profuse and violent mercurial salivation. But we suspect very few cases of the kind are to be met with now-a-days, at least in Britain. It is well enough known by those who are acquainted with the literature of surgery, that sometimes, in consequence of the mucous covering of the lips having been destroyed by ulceration, the mouth is diminished to a small round hole, occasionally not larger than will admit the little finger, and this hole shows a constant tendency to contract, nay even to become altogether obliterated. Our author once knew a man who was obliged to introduce an oiled catheter into the mouth when he went to bed, lest it should be closed altogether during the night; and he adds that Rust has seen instances of persons who died of starvation on account of the actual closure of the mouth. In all instances there is, besides, a most repulsive deformity, much difficulty in masticating, a fetid breath, and great annoyance from the irrepressible deposition of tartar on the teeth.

Various methods have been proposed for remedying this strange calamity. Attempts have been made to enlarge the aperture by bougies, sponge-tents, or plates capable of being separated gradually from one another. But it is impossible to do much good in that way, as the surrounding parts are unnaturally hard, and the foreign bodies are apt to cause irritation, ulceration, and subsequently a farther contraction of the aperture. Another, and the most common method, is the enlargement of the aperture by incisions with the scalpel. It has been found, however, impracticable to prevent the surfaces of the incisions by means of compresses from adhering again in the course of their cicatrization. They will not skin over till the foreign bodies are removed, and as soon as these are removed, the aperture gradually contracts as much as ever. A much more ingenious and sure mode of accomplishing the end in view consists in piercing a hole in each cheek where the angle of the mouth ought to be, and keeping the holes open with a lead wire till they cicatrize; after which the intervening portions of the cheek are divided. The objections to this method are, that the healing of the holes takes a very long time, —six or even sometimes fourteen months; and that the mouth ultimately formed is nothing more than a swelled hole with its edges inverted inwards.

The method proposed by Dr Dieffenbach consists in removing from each side of the hole a strip of the soft parts, with the reservation of the inner mucous coat only, and then covering the edges of the incisions with the mucous membrane, which is turned over them like a hem, and united to the edges of the skin of the cheeks. The particulars of the operation will be best understood from the following example; in which his attempt to form a new mouth was crowned with complete success.

" A young man, eighteen years of age, had been affected for some years with a bad *Herpes exedens,* of which he was ultimately cured by Dr Barez, but not before he had lost the tip of the nose, and had his mouth so much contracted, that the point of the little finger could not be introduced without great difficulty. The margin of this round hole was hard and callous, and incapable of the slightest extension. The state to which this unfortunate young man was thus reduced may easily be conceived; let it suffice, that he endured all the sufferings which have been described above as inseparable from such a complaint.

" The operation for restoring the mouth was performed in the following manner. The patient being seated on a chair, with his head held by an assistant, I introduced the pointed blade of a sharp pair of scissors into the upper angle of the right side of the aperture, and thrust it a short way between the inner mucous membrane and the more external soft parts of the cheek; the latter of which were then cut through. The little finger being now easily introduced into the aperture, I pressed outwards the part of the right cheek which was to be cut, thrust the point of the scissors gradually onward in the cellular tissue external to the mucous coat, and cut through the skin of the cheek as far laterally as the place where the angle of the mouth was to be formed. A similar incision parallel to the last was made from the lower corner of the same side of the aperture; and then I united the two by a curved incision where the right corner of the mouth was to be formed. The strip of integuments lying between these two incisions was next carefully separated from the subjacent mucous membrane, and removed altogether. A similar mode of procedure was observed with the left side, the same care being taken not to injure the mucous lining of the mouth. The patient was now able by depressing his jaw to separate the edges of the wound wide apart from each other; the consequence of which was a great stretching of the mucous membrane between them, just like the stretching of the web of a water-fowl. I now separated this membrane all round from the integuments to the extent of a few lines, and then cut the two portions along their middle towards the sides, leaving only a small portion undivided at each angle of the mouth. Whenever the hemorrhage was over, I began the *hemming* of the edges of the wounds. For this end I seized each edge of the mucous coat, and pulled it out till it was in contact with the external edge of the integuments of the cheek, and secured it there by a fine suture. When I had thus fastened the four middle points of the upper and lower lip, I drew out the undivided portions of the membrane at the angles of the mouth, united them carefully over the edge of the incisions, and thus covered the whole with a new mucous coat. A few more sutures were then introduced, till the mucous membrane and epidermis of the cheek were in perfect contact everywhere. The sutures were the simple knotted or interrupted suture and small twisted sutures with proper needles. It will perhaps serve materially to render this description clearer, when I state, that the raw lips were hemmed with the mucous coat, just as the binding is applied over the edge of a shoe. This binding was easily accomplished everywhere, except at the angles, where it was a somewhat nicer process. Finally, a few needles brought the edges of the mucous membrane also in contact with the small integumental surfaces of the old mouth, after these had been in the first instance cut across on the sides.

" The operation being finished, cold applications were resorted to, and persevered in for several days and nights without intermission. Even in four and twenty hours I was able to remove some of the sutures. On the fourth and fifth days all the remaining sutures were also withdrawn, those in the angles of the mouth being left longest, as the union at these points was of the greatest importance. The lips united almost everywhere by the first intention; in two or three points only did any suppuration show itself; and this was in its turn removed in a few days by lotions of warm sugar of lead. Before the expiry of the second week, the patient was able to do without surgical assistance. By this operation he got a complete mouth with red lips; and it preserved its form fifteen months afterwards without having contracted in the least." P. 44.

This operation appears exceedingly ingenious and well calculated to fulfil the purpose for which the author devised it. It is probable that it may be applied with equal advantage to cases where a partial adhesion has taken place on one side of the mouth,—an accident which is not uncommon.

The next subject which Dr Dieffenbach has considered relates to the mode of Restoring the Velum of the Palate when it has been destroyed by disease. This would be a very desirable object, as the want of the velum subjects the patient to the inconvenience of the food and drink frequently entering the posterior nares, and injures materially the sonorousness of the voice. Dr Dieffenbach considers that its restoration is practicable, and gives in illustration the particulars of a case in which he nearly succeeded in forming a velum by raising a flap from the inside of the fauces on each side, uniting these with the posterior edge of the palate and with one another, and allowing the flaps to be drawn across so as to meet properly by making incisions into the inner membrane of the back part of the cheek to relieve the traction. As he has not hitherto succeeded, however, and as we are not sure that we comprehend clearly his description of the minutiæ of his proceedings, we shall for the present pass over this difficult subject, and go on to a more obviously practicable and useful operation, the mode of Restoring the Prepuce in certain forms of Phimosis. This constitutes the Fourth Essay.

Sometimes the inner surface of the prepuce, in the course of obstinate chancres or gonorrhœal excoriations of the glans, contracts firm adhesions to the whole of that part of the penis; and in consequence the penis cannot enter into a state of erection without causing more or less uneasiness and often very great pain. The attempts which have been made to remedy this inconvenience have commonly failed. If the point of the prepuce be cut off beyond the glans, little or no difficulty will be experienced in dissecting back the remaining part of the prepuce; but in the course of the subsequent treatment it will be found, that as soon as suppuration is established, the prepuce will again contract adhesions with the glans and gradually spread over it as before. This result our author experienced in a case of the kind, where the prepuce adhered to the glans almost to the edge of the urethral opening. Neither will the operation of circumcision prove a perfect remedy. In the instance now alluded to, when simple raising of the prepuce would not answer, Dr Dieffenbach dissected it back a second time and cut it away behind the *corona glandis*. But as soon as the suppurating surface of the glans began to exhibit a few spots of fine cuticle, the skin of the penis began at the same time to extend towards the discharging surface; notwithstanding the frequent careful retraction of the skin, the corona glandis was soon covered again; and before the parts healed, the posterior third of the glans was covered by a projecting mass of cicatrized integuments.

To obviate this difficulty Dr Dieffenbach proposes, after dissecting back the prepuce, to remove its inner lamina altogether, to double the remaining integumental lamina inwards upon itself, and to attach its free margin to the penis immediately behind the corona glandis. By so doing a surface of sound cuticle is maintained in proximity with the raw surface of the glans; in consequence of which the latter heals without again contracting adhesions, while the turned-in surface of the prepuce acquires the softness and moisture of the natural covering. The following is one of several cases which he has described in illustration of the preceding principles.

" A schoolmaster, twenty-six years of age, in consequence of a gonorrhœa of four years' standing, was attacked with thickening and contraction of the prepuce, and eventually with adhesion of it to the glans. The dissatisfaction he felt on account of his impotence was such that he resolved on submitting to an operation. The parts were well fitted for the formation of a new prepuce, as the outer edge of the old prepuce projected half an inch beyond the point of the glans, and was also lax and wide. The point of the glans, however, could not be seen without strong retraction of the prepuce. In order to preserve as much skin as possible, I merely snipped away the outer ring of the projecting prepuce, then drew its external or integumental lamina back over the penis, and cut through the loose cellular tissue which connected this with the inner lamina as far backwards as a third of an inch behind the corona glandis. I next split through the inner lamina on the middle of the glans, and removed it by many small incisions with the scissors, the flaps being at the same time pulled tightly with the forceps. This lamina was unnaturally thick and altered in structure. It was now easy to turn the outer lamina of the foreskin inwards, and to bring its cut edge behind the corona glandis. The parts were retained in their place by rolling the penis spirally with thick cotton threads covered with adhesive plaster.

" The after-treatment consisted in cold fomentations and a rigid diet. After the subsidence of a pretty smart inflammation which occurred on the first day, suppuration was established on the surface of the glans. In order to prevent fresh excoriations from being formed on the inside of the new prepuce, a mixture of infusion of elder with sugar of lead water was injected between it and the glans every hour. On the twelfth day the plaster threads were cut, as the healing was going on to my wish; but the glans was not completely skinned over for eight days longer. I then for the first time ventured to draw the new foreskin entirely back, and found it firmly united all round immediately behind the corona glandis.

" I saw this patient at a later period, and was not a little surprised to find the prepuce farther elongated, and so like a natural one, that it was impossible to discover any difference. But what surprised me still more was the increased delicacy of its inner surface which was turned towards the glans. It appeared red and moist, and a secretion must therefore have been established from it like that of the inside of the natural prepuce. It is well known that mucous and serous membranes, when constantly exposed to the air, assume the texture and appearance of the cuticle. But I was not previously aware that the skin, when removed from the access of the air by being turned inwards, changed itself into a secreting membrane. This secretion was not merely perspiration; and still less was it thrown out by the glans; for the glans by the fresh formation of a cuticle was much less calculated to secrete than the inner surface of the prepuce." P. 61.

The fifth subject of inquiry which has engaged Dr Dieffenbach's attention is the cure of Lacerated Perinæum. He has here entered into considerable details on the practice of other surgeons, besides describing minutely his own method, and various cases which illustrate it. His attention has been turned chiefly to the worst description of cases, where the rent extends along the whole perinæum, so as to make a communication between the rectum and vagina, and render the patient incapable of retaining the feces. Such cases are always very obstinate, and sometimes defy the most persevering efforts of the surgeon.

It has been generally conceived that the operation for re-union of the lacerated perinæum is undertaken with the fairest prospects of success during child-bed, because the parts have not acquired that callosity and indolent character which they assume when of old standing. Dr Dieffenbach, however, opposes this practice, and maintains that it has appeared more successful than the contrary system, only because the lacerations which are commonly healed in this way are of insignificant extent, and will on that account heal at any time. In the instance of an extensive laceration, which connects the rectum with the vagina, he urges that if we take into consideration the exhaustion the patient must have endured from the kind of labour by which alone so severe an injury could have been produced—the impossibility of making her preserve in her debilitated state, for an adequate length of time, the position requisite for the cure,—the obstruction which the healing of the wound will experience from the flow of the lochia, and the preternatural secretion of the vaginal mucus for some time after delivery,—and the contused nature of the wound which is to be united,—it must be preferable to wait till the patient's health is restored, even although the sides of the wound should become indurated, because there is no difficulty in giving them with the knife surfaces much better fitted for adhering than the original surfaces of the laceration.

He proposes that before the operation is begun, the intestines shall be thoroughly cleared out by laxatives and clysters, after which opium is to be administered and repeated at intervals, to prevent any discharge from the rectum for eight days at least. The surfaces being brought into the state of a fresh wound by the removal of their indurated exterior, they are to be brought closely in contact at the centre by a strong knotted suture, which is introduced in such a manner as to pass through the loose cellular tissue at the bottom of the wound; two small needles with twisted sutures are then to be introduced through the lips of the wound on the vaginal side of the principal suture; the little slit in the rectum itself is then to be united by two knotted sutures introduced with small stitching needles; and two twisted sutures are lastly passed through the lips of the wound, between the rectum and great central suture. The ligatures and ends of the needles are cut away as close as possible. The most important part of the operation still remains. This is the dividing of the integuments on each side of the wound, by an incision running at the distance of half an inch, in nearly a parallel direction with it, but curved a little outwards at the middle. These incisions are no sooner made, than the stretched state of the newly united parts at once ceases, the central wound retires backwards so that the lateral cuts appear like free incisions or steps with sharp edges, and the slight movements of the patient, which it is impossible to prevent altogether, have no influence on the sutures or the adaptation of the surfaces. The treatment consists of the constant employment of cold poultices for the first few days, the careful cleaning of the parts by squirting warm water, restriction to a low diet, and the maintenance of the constipated state of the bowels for eight days. A T bandage, or any other more complicated bandage, a pessary or sponge in the vagina, or any of the other mechanical means resorted to for maintaining the parts in a state of rest, is unnecessary by this mode of operating, and many of them cause inconvenient irritation. The removal of the urine by the catheter may be advisable, but is unnecessary if the hair has been shaved away from the parts before the operation. About the fourth or fifth day lead lotions may be substituted for the cold poultices, and charpie placed on any spots which are suppurating. The sutures may be gradually withdrawn between the fifth and tenth days. Not infrequently, although the parts have united generally, a small rent is left in the rectum. This, however, is commonly found to heal up gradually by the careful use of stimulant applications to encourage granulation. The lateral incisions require no particular attention, as they are covered by the poultices in the early period of the treatment, and may be dressed with charpie afterwards till they heal up; which commonly happens in fourteen days.

Dr Dieffenbach has described with much minuteness and perspicuity a case in which the plan now mentioned was completely successful. In eight days every part adhered firmly except a small fissure in the rectum, which was also filled up by granulation before the end of the fourth week. The patient, a servant who had been reduced to a state of great misery and helplessness in consequence of the unceasing involuntary discharge of flatus and feces, was thus restored within a month to a state of perfect health.

The sixth of the author's essays relates to the restitution of the partially destroyed Urethra by Transplantation of the integuments. This operation has been practised with success by various surgeons since Mr H. Earle first succeeded in restoring by it a gap in the urethra of a patient in St Bartholomew's Hospital. Dr Dieffenbach's case was but partially successful. The chief novelty in it consists in his applying to this operation the principle adopted in that for lacerated perinæum, for relieving the tension of the parts connected by the sutures. He makes a longitudinal incision, parallel to the line of union, on each side, and at a short distance from it, through the integuments covering the penis or perinæum; after which the sutured parts become at once relaxed, and remain without disturbance in a state of close apposition.

Art. IV.—*A Pathological Inquiry into the secondary Effects of Inflammation of the Veins.* By James M. Arnott, Surgeon. Medico-Chirurgical Transactions, Vol. xv. Part i. Pp. 131. London, 1829.

Though the disease termed Phlebitis or venous inflammation has been the subject of much research since the time when it was first investigated by John Hunter and Mr Abernethy, several points regarding its nature and effects are still involved in obscurity. Though we know that the internal surface of veins is liable to become the seat of inflammation which, though producing albuminous exudation, is chiefly suppurative, we are entirely ignorant of the circumstances under which this inflammation may take place, and we know nothing of the causes which in any given case are favourable or hostile to its developement. Though we know that it is inflammatory in its nature, we daily oppose it by the most powerful antiphlogistic means without success. Though in its symptoms and general effects on the system it assumes in its latter stage a striking resemblance to the most exquisite forms of typhous or putrid fever, no resemblance can be traced between these two affections either in origin, in pathological characters, or in termination. And lastly, though it is so certainly fatal that it is very doubtful if recovery ever took place from any well-marked case of the disease, we are entirely ignorant of the manner in which it operates in producing the fatal event.

Though the author of the essay now before us does not undertake to determine every one of these points, yet, since his observations tend to illustrate some of them, we believe we may render a service not unacceptable to our readers, if we direct their attention for a little to some of the researches of Mr Arnott.

By the secondary effects of inflammation of veins, Mr Arnott understands not only secondary effects properly so called, but the symptomatic disorder to which the local inflammation gives rise, and which, though always severe and affecting a large assemblage of organs and functions, is certainly not more so than is occasionally seen in some other diseases. Of this use of the term *secondary* we confess we were inclined to disapprove and to regard it as not logically correct. Though constitutional symptoms, or what we must continue to call symptomatic fever, it may be observed, may in one sense be called secondary, this epithet is generally reserved to an assemblage of symptoms, which are not only of posterior date, but sometimes of a very different nature from those of the primary and local affection; whereas the symptomatic disorder of *phlebitis*, even as described by Mr Arnott, and as all of us have witnessed it, is simultaneous and co-existent with the local action.

The effects more especially distinguished as secondary consist in inflammatory processes of violent character terminating in effusion of purulent fluid or lymph, taking place in textures and organs remote from the situation of the original disease. In this there is certainly more justice; and we presume it cannot be doubted, that, if the term *secondary* is to be used at all, it should not be applied at once to the constitutional disorder, and what may be termed the *consecutive effects* of venous inflammation; and that since the constitutional or general symptoms are simultaneously, and, we believe, necessarily connected with the local process, and the secondary appear to succeed this process, a line of distinction ought to be drawn between them. Admitting the existence of these subsequent inflammatory processes, which are often of the nature of metastasis, we conceive they would more justly merit the denomination of consecutive than secondary effects.

Having settled these preliminaries, we may now proceed with the more immediate matter of the researches of Mr Arnott. The want of accurate knowledge in which the subject of venous inflammation is still involved, has been already remarked. The inquiries of Mr Arnott tend, if not to explain all, at least to throw light on some of the doubtful points. It has been an opinion very generally adopted that the cause of death in venous inflammation is the propagation of the disease along the inner venous membrane to the heart. This opinion, which was originally thrown out in the form of a conjecture by John Hunter, Mr Arnott undertakes to prove rests on no solid ground, and is inconsistent with the facts hitherto recorded on the question. From his own observation, and from cases already recorded, he gives the history and necroscopic details of seventeen cases of fatal *phlebitis*, to show, that, so far from death resulting from the extension of the inflammatory process to the heart, it had not extended along the great veins. Thus of ten cases in which venous inflammation followed venesection, in five it had not reached the subclavian or even axillary vein, and in none was the superior *cava* affected. In three cases, in one of which inflammation succeeded puncture and ligature of the popliteal vein, and in two amputation, the disease spread to the inferior *cava*, but in one only from Cooper and Travers's Essays, were traces of inflammation spreading to the right auricle recognized; and in this instance the inflammation is said to have exhibited the diffuse characters. Of the remaining four instances, one after puncture, one after amputation, one after division of the saphena, and one after excision of a portion of that tube,—in the first, inflammation was traced to the common iliac, when the inspection was stopped; in the second, though the femoral vein contained purulent matter as high as Poupart's ligament, and irregular masses of soft lymph above this, the inferior *cava* was not inflamed; in the third, the marks of inflammation terminated abruptly at the ham in the posterior saphena; and in the fourth, though the inner surface of the femoral vein was reddened, the *cava* was healthy.

From these facts, Mr Arnott thinks himself justified in inferring that the cause of death in *phlebitis* does not consist in the extension of the inflammatory action to the heart or its cavities. The only direct facts hostile to this opinion are two cases recorded by M. Ribes in the *Révue Médicale* for July 1825. "In one occurring so far back as the year 1799, where the veins of the arm were inflamed, in connexion with gangrene of the hand from chilblain, 'traces of inflammation' are stated to have been continued into the superior *cava,* and even to the interior of the right auricle and ventricle; and in the other instance, where the saphena evinced some signs of inflammation, in a case of mortification of the leg and foot, it is stated in the same vague terms, that the right auricle and ventricle of the heart, as well as the inferior cava, at its insertion into the organ, had manifest traces of recent inflammation."

It cannot be denied that this description is much too general to afford a foundation for any positive conclusions; and when it is remembered how easy it is, in inspecting the interior of the heart and large vessels, to mistake pseudo-morbid for genuine appearances, Mr Arnott cannot be accused of excessive scrupulosity in refusing to admit the cases of M. Ribes as adequate evidence against his views. In short, if Mr Arnott does not prove that death does not depend on the propagation of the disease of the vein to the inner membrane of the heart, he certainly succeeds in showing this opinion is still destitute of proof, and that the facts hitherto recorded are totally incompetent to establish it.

From these cases it further results that the severity of the constitutional disorder and the dangerous consequences of inflammation of the venous tissue bear no proportion to the space of vein affected. The disease may be confined to a small part of the vessel originally affected, or it may spread along this and into contiguous vessels; but in both instances it gives rise to the same constitutional disorder; and in the former it is quite as liable to produce serious consecutive disease as in the latter.

Here it may justly become an object of inquiry, whether inflammation of venous tissue is inevitably and invariably a fatal disease; and it constitutes a point of some moment to determine whether the records of the art contain any authentic case in which, after inflammation was fully established in the interior of a venous tube, recovery had taken place. On this topic Mr Arnott's researches furnish no information; but the following statement of facts from other sources may show what has already been ascertained; and in appreciating their evidence, it is almost unnecessary to observe, that to demonstrate necroscopically the effects of inflammation, is to demonstrate the previous existence of that process.

The first fact of this nature is found in the *Mantissa Anatomica* of Joannes Rhodius, a physician of Padua, who distinguished himself in the collection of medical and anatomical cases in the 17th century. In this case, in a person who laboured under violent epigastric pulsation during life, the *vena cava* was filled with matter termed adipose and medullary, which appears to have been coagulable lymph, and which is said to have produced adhesion of its sides.[*] Thomas Bartholin in like manner mentions generally a case of obliteration of the *vena cava* near the heart in a person who died tabid. Among other instances of morbid changes observed in veins recorded by Morgagni, one mentioned in his 56th epistle in the person of a lame woman of 40, deserves attention. In this the parietes of the left iliac vein, which with its branches was shrunk and pale, were united by means of a polypous fibrous mass, which was soft and lacerable, and which appears to have been coagulable lymph secreted by previous inflammation.* Haller in like manner records a case in which the internal jugular vein of the left side contained a polypous fibrous pulp, which not only filled the cavity of this vessel, but extended into the transverse branch, which communicates with the external jugular vein. In this case, however, it must not be denied that obliteration had taken place not only in the vein but in the carotid artery, in consequence of the pressure of an aneurismal tumour; and it may be argued that the matter in the interior of the vein was not the product of inflammation, but merely coagulated blood, the effect of stagnation.† If, therefore, the evidence of this fact is questionable, greater importance must be allowed to another, in which the same observer informs us he found the *vena cava* between the renal veins, and the iliacs adhering so as to leave no cavity except what was occupied by a fibrous, fleshy, polypous, and indurated mass. As in this instance there was no aneurism or tumour, which could compress the vein and cause stagnation of its contents as in the former, Haller candidly confesses his inability to explain the reason of the obliteration.‡ It is by no means unreasonable, nevertheless, to infer, as cases subsequently to be mentioned show, that the fleshy substance was coagulated lymph organized, secreted at a former period by the inflamed inner membrane of the tube.

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[*] Mantissa Anatomica Joannis Rhodii, Obs. 21.

Much more unequivocal examples are those recorded by Dr Baillie and Mr Wilson in the first and third volumes of the Medical and Chirurgical Transactions. In the former case, the obliteration which had taken place from the emulgent veins to the entrance of the *venæ cavæ hepaticæ*, is ascribed to effusion of lymph and consequent adhesion; and in the latter, though in the *vena cava* there were found four ounces of purulent matter, a considerable quantity of coagulable lymph below the entrance of the hepatic veins united the opposite sides of the vessel, and prevented, it is said, the purulent fluid from proceeding to the heart. In the first case it is evident that the individual had not died from the inflammation of the vein; in the second, it is at least rather doubtful. But even this doubt is diminished, if not entirely removed, by several of the cases recorded by Hodgson, Breschet, Bouillaud, Andral, and Reynaud, in which death did not take place in consequence of the immediate affection of the vein, but in consequence either of the disease induced by that alteration, or of some disorder entirely different. It must not indeed be denied that the evidence requisite to establish the point is scanty, and by no means precise; and it may be premature to lay it down as a certain fact, that venous inflammation is not in all instances fatal. But, so far as the evidence goes, it may be at present inferred, that in some cases recovery appears to have taken place, and that this favourable issue is more likely to occur when the inflammation is confined to the effusion of lymph, than when it proceeds to the secretion of purulent matter.

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* Epistola Anatomica-Medica, lxi, Art. 10.
† Observ. xxiii.
‡ Observ. xxiv.

The next point which demands consideration is the nature of the secondary or consecutive affection. This, according to the researches of the author, consists in one or more of the following lesions. 1*st*, Exudations of coagulable lymph on the surface, and effusion of sero-purulent fluid into the cavity of the pleura and pericardium; hepatisation of the lungs, infiltration of purulent matter into their tissue or that of the heart, or small collections of lymphy purulent matter in the substance of the lungs. In ten of the seventeen cases these appearances were recognized. In three the chest was not inspected; in two the condition of the organs is not remarked; and in two no morbid change was observed. 2*d*, In the cellular tissue both intermuscular and subcutaneous, were deposites of purulent or sero-purulent fluid, accumulated in abscesses or disseminated in minute parcels. This lesion was observed in six cases. 3*d*, In one case inflammation of the synovial membrane of the knee-joint had given rise to effusion of purulent matter within the articular cavity, eroded the cartilage, and denuded the bones, in the course apparently of four days. In two other cases in which the knee-joint was painfully affected, necroscopic examination was not performed. 4*th*, In one case the cornea became opaque with injection of its vessels and destructive changes in its coats and humours. In a subsequent part of his essay, Mr Arnott relates the case of a young man, in whom puncture of a vein during the process of carrying a needle and ligature round the left carotid artery for aneurism of one of the temporal branches was succeeded by internal inflammation of the eyeball, sloughing of the tunics, and discharge of the humours, and eventually purulent collections in different parts of the body, lumbar abscess, and death. And lastly, opacity and thickening of the arachnoid membrane, effusion between it and the *pia mater*, and into the ventricles, were remarked in five cases; and in the case of the young man already noticed, much purulent matter was found between the arachnoid and *pia mater*, along the base of the brain and the spinal chord.

Now the point for examination here resolves itself into two questions. *First*, are these lesions in organs so different from each other, and so remote from the original seat of the malady necessarily connected with it? Do they originate from the same general cause? Do they constitute integrant parts of the same disorder? *Secondly*, If they do, in what manner, or by what means, anatomical, physiological, or mechanical, are they connected with it?

On the first question Mr Arnott seems to entertain no doubt. From the outset of his inquiry, indeed, he assumes that the consecutive inflammatory and disorganizing processes are all to be ascribed to the inflammation primarily existing in the interior of the venous canal. It is nevertheless manifest that these consecutive affections are by no means constant; and though they are observed in several cases, these may be thought too few to justify the inference, that they are the result of the primary venous inflammation. To this it may be replied, that of the seven cases in which evidence of disease of the chest or its contents was not obtained, in two only was it positively determined that no disease existed, and in one of these purulent matter was deposited under the skin of the opposite fore-arm, and there was affection of the knee-joint, and in the other matter was deposited in the cellular tissue of the corresponding thigh, and of the opposite shoulder, and violent disorganizing inflammation took place in the articular apparatus of the knee-joint. When all the circumstances of these cases, therefore, are considered, it appears by no means unreasonable to think that some connexion may exist between the primary venous inflammation and the purulent, sero-purulent, or purulent-lymphy deposites, which are ultimately observed in so many of them. At the same time we must be allowed to remark, that to give this inference the stability of a general principle, it is requisite to obtain the evidence of a greater number of cases.

Regarding the lesion of the brain and its membranous envelopes, less difficulty, we think, must be experienced. The appearances found in the five of the eight cases submitted to inspection were such as to cause no more difficulty than the appearances presented by the persons of those who have been cut off either by continued or typhous fever, or the symptomatic fever resulting from severe wounds and injuries. In all these instances of disease, more especially in the symptomatic fever supervening in bad gun-shot wounds with or without gangrene, in compound fractures and luxations of the large joints, and in large contused wounds passing to gangrene, the same state of the brain and its membranes, as that remarked by Mr Arnott, is very constantly recognized. In scarcely one instance indeed of death after compound luxation or contused wounds, have we failed to remark the opacity and thickening of the arachnoid membrane and *pia mater*, the infiltration of the subarachnoid tissue, and more or less fluid in the ventricles. These appearances we conceive result from the capillary congestion, which constitutes so important a part of the symptomatic fever; and if this be admitted as a reasonable explanation of their origin in the kinds of injury now mentioned, the same cannot be denied in the case of the symptomatic fever of venous inflammation. In these lesions therefore of the brain and its envelopes we are not disposed to recognize any thing peculiar to venous inflammation or its effects.

Admitting, therefore, for the sake of argument, the necessary connexion between the primary affection of the vein and the consecutive deposites of purulent matter, it comes next to be inquired by what means are the two processes connected. It was early suggested by Mr Hunter, that the cause of the fatal termination of this disorder, as alternative to the circumstance of inflammation spreading to the heart, is " the matter secreted by the inside of the vein passing along that tube to the heart, and mixing with the blood." This idea of purulent matter entering the circulation and being mixed with the blood, though partly entertained by Hodgson, and afterwards by Bouillaud, and even deriving some support from the recent experiments of Magendie and Gaspard, is nevertheless rejected by Travers, who maintains not only the innocuous tendency of the suppurative inflammation, but the harmlessness of purulent matter even in the circulating fluid. Mr Arnott remarks, that in 14 of the 17 cases, purulent matter, either alone or with lymph, was found in the vessel after death; and though in two cases purulent matter is not mentioned, adhesive matter in the one case in the femoral vein, and flakes of lymph in the other, were found in the external iliac and lower *cava* as far up as the entrance of the emulgents. In one case only neither purulent matter nor lymph was found in the vessel. Though from these facts it might be inferred that the passage of purulent matter into the circulation is one of the principal circumstances tending to the fatal issue of venous inflammation, Mr Arnott thinks they do not justify the conclusion, that it is the sole and the constant cause of this result. This inference, he remarks, is further opposed by the fact, that the unfavourable symptoms are in some instances developed at a period of the disorder much too early to admit of the supposition of purulent matter being formed. In confirmation of this, he refers to a case which occurred to Mr Freer, as recorded by Mr Hodgson, and in which they appear to have come on four hours after ligature of the saphena. Here, however, it may become a matter of doubt whether the fact be correctly stated, and whether some fallacy does not exist in the manner in which, it has been already noticed, Mr Arnott understands the occurrence of secondary symptoms. It cannot be doubted, we conceive, that the symptoms which took place four hours after ligature of the *saphena* were those simply indicating the commencement of venous inflammation. Nor can it be doubted, that, to explain the symptomatic disorder, or what Mr Arnott terms the constitutional affection of *phlebitis*, it is quite unnecessary to have recourse to the idea of suppuration, since that symptomatic fever unquestionably accompanies every example of venous inflammation from the first, whether purulent matter is formed or not. In this respect, therefore, we must be allowed to say that Mr Arnott involves himself in an unnecessary difficulty, by confounding the symptomatic fever with effects, which, if connected with venous inflammation, are to be regarded, not as symptomatic but consecutive.

In the subsequent prosecution of the inquiry, Mr Arnott directs the attention of the reader to the resemblance which the secondary effects of venous inflammation bear to those resulting from the introduction of a morbid poison, and more especially that which is believed to be inoculated by wounds and punctures received in the inspection of the recently dead subject. Having adduced several facts in confirmation of this opinion, which is doubtless not improbable, he rather inconsistently with his former train of reasoning concludes, that, while it is not proved that death takes place from inflammation spreading to the heart, the history and character of the symptoms by which the fatal event is preceded, the small portion of vein inflamed, and the presence of purulent fluid in its cavity, concur in showing that the entrance of this fluid into the circulation is the principal cause of the fatal consequences of *phlebitis.* This conclusion, however, he modifies by the qualification, that a similar influence may perhaps be exercised by any inflammatory secretion from the vein.

Regarding the mode, however, by which the presence of purulent matter or inflammatory secretions in the blood operate in producing consecutive effects, we do not perceive that Mr Arnott offers any definite explanation. He indeed draws a comparison between these effects and those deposites referred by the older pathologists to the head of *metastasis;* and afterwards referring to the instances of inflammation in internal organs, especially in the lungs, which have been so often observed to constitute the cause of death in severe wounds of the extremities, capital operations, and violent injuries, he entertains for a moment the possibility of the purulent matter being absorbed from the surfaces primarily diseased and conveyed to the textures secondarily affected. From this view, however, he immediately passes, in order to ascribe the phenomena of consecutive abscesses and deposites immediately and directly to inflammation of the venous tissue, as previously demonstrated; and he ultimately proceeds to trace a very great variety of affections of internal organs taking place in persons labouring under injuries of the extremities, injuries of the head, and in females after parturition, to the circumstance of inflammation in one or more veins in any organ supervening during the symptomatic fever. In this inquiry, which is both lengthened and circuitous, we regret that our limits do not permit us to follow the author. It is further less necessary, in so far as it consists of practical illustrations of the general principle which he undertakes to establish, and which, therefore, it is superfluous to transfer to these pages. Before concluding, however, we offer one or two observations.

We have above attempted to communicate some idea of the chain of reasoning by which Mr Arnott endeavours from a considerable collection of facts to establish his inferences. He must be admitted to prove, as nearly as the thing is susceptible of proof, that the fatal event in venous inflammation does not in all cases result from the extension of the disease to the heart. In regard to what may be considered as his second position, that the consecutive abscesses are the result of venous inflammation, we think he treats it throughout his inquiry too much in the light of an established and constant fact. He does even attempt to adduce evidence of any kind in its favour, and makes every use of it in his inquiry, as if no doubt could be entertained of its reality. Though we say this not in absolute scepticism, we must be allowed to suggest to Mr Arnott, that, if his inquiry has a weak point, it is in this position; and if he could confirm it by suitable demonstration, it would add much to the strength of his theoretical views. In attempting to establish what may be regarded as his third position, that the fatal effects of venous inflammation and the consecutive abscesses are the consequence of admixture of purulent matter and inflammatory secretions with the blood, his mode of reasoning is neither conclusive nor very consistent. Though at one time adverse to the idea that the presence of purulent matter in the circulating fluid is the cause of the mischief, he after a good deal of hesitation concludes by ascribing it partly to this, partly to the presence of other secretions. Of his fourth inference, which may be regarded as the application of the hypothesis to explain the occurrence of fatal consequences in different diseased states of the system, it may be said that it possesses at least the merit of ingenuity in some respects, and plausibility in others. It further throws open a new and extensive field for pathological observation; and if it be productive of no other advantage than that of directing the attention of surgeons to the state of the veins in necroscopic inspections, this is by no means inconsiderable. In this manner the hypothesis proposed by Mr Arnott in the second part of his paper may soon be put to the test of observation, and finally be assigned that place in pathological science to which, in strict justice, it may be entitled.

ART. V.—*De la Phlébite, &c. On the Treatment of Inflammation of the Veins and Phlegmonous Erysipelas by the Compressing Bandage.* By ALFONSE VELPEAU, M. D *(Révue Médicale Française et Etrangère,* Juin 1829.*)*

THE method now generally adopted in Britain for the treatment of phlegmonous erysipelas and the inflammation of the veins with which it is often accompanied, consists in dividing the integuments of the diseased part by several deep incisions. This severe measure, which was first proposed and resorted to by Mr Hutchison, and has lately been introduced into general practice in consequence of the recommendation bestowed on it by Mr Lawrence, has undoubtedly been often singularly successful. If it were necessary we could add our testimony to this effect, having at times seen it apparently save the patient's life in very desperate circumstances. It cannot be denied, however, that the treatment by numerous deep incisions is an exceedingly harsh practice, which is admissible only on account of the extreme danger of the diseases to which it has been applied, and our ignorance of a more gentle and equally effectual method of counteracting them.

If, however, the statements now and lately advanced by M. Velpeau shall be found to be warranted by the experience of others, there is another method of cure, which is not only far more simple and less severe, but likewise even positively more certain. This is the application of a tight spiral bandage to the affected limb. On two former occasions we took some notice of the author's observations on the employment of the compressing bandage in the treatment of burns, erysipelas, and spreading subcutaneous inflammation; * and we announced his intention to try its effects in phlebitis or inflammation of the vein. The paper now before us contains the results of his experiments on that subject; and so far as a single man's experience will go in a matter of this kind, the facts now published are decisive of the superiority of the bandage over the plan by incisions.

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* Vols. xxvi. 449, and xxvii. 219.

We shall at once proceed to state shortly the leading features of some of the principal cases which have led M. Velpeau to this conclusion.

Case 2.—A young chemist was attacked in July 1826 with acute pain in the right limb and much inflammatory fever. Twenty-four hours after the commencement of the symptoms M. Velpeau found the whole leg and thigh much swelled, except on the outer part of the latter. The skin was red in patches chiefly over the course of the *saphena* vein and outside of the leg. It was impossible to feel the vein in the leg on account of the swelling, tension, and extreme tenderness of the integuments, but in the upper part of the thigh where the inflammation was less violent, the *saphena* formed a round cord, quite distinct to the touch. The pulse was frequent, full, and hard, the tongue white, the thirst urgent, the skin hot and dry. His illness commenced two days after he remarked a crack in the lower part of the leg, accompanied with pain. He had also a small suppurating sore on the outside of the heel, about a week old, and the effect of a slight excoriation of the skin.

Venesection was immediately performed, and sixty leeches were applied to the limb; and next day, as the amendment produced was not material, forty leeches more were applied. Cataplasms and the warm-bath were also resorted to. On the fourth day there was still no material improvement. The leg was much distended and presented entirely the characters of phlegmonous erysipelas; in the thigh, which was also much swelled, the indurated *saphena* vein could be felt as low as six inches above the knee, while the red patches along its course reached within a few finger-breadths of the groin; and in the groin itself some inguinal glands were somewhat enlarged and tender. Twenty leeches were applied to the groin and as many to the leg. On the fifth day there was no improvement in the local symptoms, but the general fever had abated a little. The constant application of cold lotions was now tried and persevered in for twenty-four hours, but without any advantage.

On the sixth day, M. Velpeau, who had previously urged the application of the compressing bandage, obtained permission to resort to this remedy; and it was rolled with moderate tightness from the toes to the groin, and then moistened with infusion of mallows. In the course of the same day the pain was every where much alleviated, except at the dorsum of the foot and outer ankle. At night the patient slept well; and next morning the swelling had diminished to one-half on the leg, and had entirely disappeared from the thigh, where, however, the indurated vein could still be felt. At the dorsum of the foot and outer ankle suppuration was threatened. On the eighth day a small abscess was opened at the former point; but at the ankle fluctuation was not perceptible. Every where else the pain and swelling had altogether disappeared. A poultice was applied to the outer ankle, and the compressing bandage reapplied on every other part. On the eleventh day a small deep-seated abscess was opened close to the *tendo Achillis*, after which the patient was soon enabled to walk. For some time, however, the vein continued hard, and the limb subject to œdema, notwithstanding the use of the laced stocking.

Case 4.—A medical student three days after sustaining a puncture of the left middle finger while dissecting, was attacked with stiffness and numbness of the whole arm, and next day with redness, pain and swelling of the injured finger and hand. He applied twenty-five leeches to the hand without experiencing any relief. On the third day, when M. Velpeau first saw him, the whole metacarpal veins were of a purple colour; those of the fore-arm were also somewhat hard, painful, and much inflamed; and the inflammation had even passed the elbow. The whole cellular texture of the injured finger, hand and wrist, participated in the inflammation. The compressing bandage was proposed; and although the patient expressed some reluctance to submit to its application, it was applied from the fingers to the shoulder, a *gantelet*, or short glove being put upon the fingers, and the spiral turns of the bandage begun at the extremity of the metacarpus.

In the evening the pain, heat, and fever, had abated considerably. The tightness of the bandage was increased by moistening it with brandy and water. Next morning there was not any fever; and the patient was able to visit M. Velpeau to get the arm dressed. The inflammation of the integuments had disappeared from the arm and great part of the fore-arm. But the veins of the fore-arm were still marked by red painful streaks; and the swelling of the hand continued. The bandage was continued during the fourth, fifth, and sixth days. On the seventh a little œdema of the pricked finger was all that remained of the disease; and on the eighth, the patient finding himself quite well, gave up the use of the bandage.

Case 6.—In February 1828 a candidate for the medical degree, while putting on the table a body considerably advanced in putrefaction, scratched the thumb of his left hand. On the third day he had an attack of severe rigor, followed by paleness of the countenance and much general uneasiness, with swelling of the thumb and numbness of the arm. On the fourth day, when M. Velpeau first saw him, there was high fever, dry burning skin, white tongue, and yellowness of the features. The whole fingers and hand were much swelled and livid; the fore-arm and arm were similarly, but less severely affected; the skin was deeply coloured as high as the elbow; but the veins could not be felt. The treatment was confined to blood-letting and the use of poultices. In the evening the axillary glands were swelled, and the erysipelas extended to the shoulder, while the hand and the wrist were so gorged and livid that they seemed to be threatened with gangrene. The compressing bandage was immediately applied with great care, the glove being first drawn over the fingers, and the roller being then wrapped round the arm above the insertion of the deltoid muscle, and so as also to compress the axilla. The whole apparatus was moistened occasionally with infusion of mallows.

Next morning the fever had ceased, the countenance was almost natural, the inflammation had greatly abated on the arm and even also on the fore-arm; but the hand continued swelled, livid, and affected with darting pain; and the cuticle around the scratch had separated to the distance of half an inch, and formed a *phlyctena*. The bandage was renewed and moistened with brandy and water. The hand, however, was constantly affected with acute pain and heat. On the sixth day the arm was quite well, and the fore-arm was continuing to improve rapidly; but the back of the hand was much elevated, as if a deep abscess had formed. The wound was enlarged without any pus being discharged from it. The pressure on the fingers and hand was increased. During the subsequent night the pain was so severe in the hand, that the patient removed the bandages. Next morning the fore-arm was quite well and the hand was better; but the patient complained of a severe bruising pain like that caused in the foot by a tight shoe. This pain and the previous suffering referred to the hand was ascribed by M. Velpeau to the bandage having been firmly applied without pads being placed in the palm to equalize the pressure; and when the omission was at last supplied the pain gradually ceased. On the ninth day the hand was much less swelled; but a gangrenous *phlyctena* formed on the points of all the fingers, which had been allowed incautiously to rest too heavily on the cushion. An eschar separated from each of these phlyctenæ in the course of eight or ten days, and the nail and last phalanx of the fore-finger were subsequently lost. The remains of the swelling were speedily removed by the uninterrupted use of the bandage.

The last of these cases is particularly valuable, as it shows that the very worst forms of diffuse cellular inflammation may be promptly reduced by the simple treatment here proposed. It also illustrates admirably the extreme importance of regulating the pressure uniformly by filling up the natural hollows with proper pads and preventing small portions of the limb from bearing the weight of it for any length of time. There is no doubt, that, as M. Velpeau specifies in his former papers, the success of the treatment by tight bandaging must depend greatly on the uniformity and smoothness with which the roller is applied; for wherever the pressure is less than on the surrounding parts, there the inflammation will not only go on without control, but will probably be even augmented in consequence of the resistance opposed by the surrounding pressure to the free return of blood.

It is unnecessary to quote any of the other examples related by the author in his paper, as they all agree in their leading particulars with those already noticed. It does not appear that he has hitherto met with a case where the method was unsuccessful.

M. Velpeau suggests that advantage may be taken of the effect of compression in checking inflammation of the vein, to prevent its formation in cases where operations are performed on the veins of the extremities, and where it is well known that fatal phlebitis has not unfrequently resulted. In not a few cases of death after amputation of the leg, the great veins have been found severely inflamed. Here, too, it is reasonable to suppose that such an event may be warded off by the practice adopted by most surgeons, of applying the circular bandage tightly round the stump.

As the compressing bandage is likely to come soon into general use as a remedy for inflammation of the veins, and, if found to possess all the certainty ascribed to it by M. Velpeau, must really be accounted an important discovery in the practice of surgery, it is right to mention that compression appears to have been employed for parallel purposes by various surgeons, before it was thought of by him. Ambrose Paré employed it with success to check what appears to have been a severe case of phlegmonous erysipelas, consequent on the operation of venesection. Theden also used the compressing bandage in erysipelatous affections of the extremities. John Hunter recommended in inflammation of the veins, that pressure should be applied on some part of the course of the affected vessel, with the view of disturbing the tendency of the disease to spread along a continuous membrane; and if his instructions had not been lost sight of, it is highly probable that the method by compressing bandages would have been in general use before now, and many lives saved which have been sacrificed by this alarming disorder. In 1815, M. Bretonneau of Tours recommended the employment of tight spiral bandages in the treatment of burns. But M. Velpeau has been the first to show that all forms of erysipelas of the extremities, as well as phlebitis, are checked by this treatment, and to recommend it forcibly to the attention of practitioners, by stating the results of an extensive personal experience.

ART. VI.—*Observations on the Nature and Treatment of Cholera, and on the Pathology of Mucous Membranes.* By ALEXANDER TURNBULL CHRISTIE, M. D. Madras Medical Establishment, and lately in Medical Charge of the Civil Department in the Southern Mahratta Country. Edinburgh, 1828. Pp. 137. 8vo.

THE work of Dr Christie, which ought to have been noticed by us at an earlier period, consists chiefly of some interesting facts and ingenious speculations regarding the pathology of the Indian cholera. We have brought before the reader on several occasions the opinions entertained by eastern practitioners as to the nature of this formidable disease. * On referring to the information formerly communicated it will be found that there has been no want of pathological theories. Some have conceived that the disease is an inflammatory affection of the bowels, others that its fundamental cause is a depraved state of the blood, consisting chiefly in deficient oxigenation, and others that the cause is a deranged state of the general nervous system, or of its centre the brain. Of all the notions which have been entertained, none certainly has appeared to us so probable as the doctrine which refers its pathological cause to a disorder of the alimentary canal, although perhaps it is not so clear that this disorder is of an inflammatory nature. It has always appeared to us singular that so few of the eastern physicians who have written on cholera have been led to adopt this opinion, and that so many should have looked for the pathological cause in affections of the nervous or circulating systems, the disordered states of which to a European pathologist would assuredly seem to be not primary but secondary circumstances in the train of phenomena constituting the disease.

Dr Christie, however, has firmly espoused these views, and has explained and supported them in the present treatise with much power and judgment. He has been led from his pathological investigations to maintain that the primary derangement in the Indian cholera is a peculiar disorder of the mucous membranes generally, but which affects more especially the mucous membrane of the alimentary canal. This disorder he considers to be analogous if not identical with catarrh, which he attempts to show is an affection of the mucous membranes differing from inflammation, though related to it.

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* Analysis of the Presidency Reports, Vol. xxiv. Mr Annesley on the Diseases of India, Vol. xxv. Dr Kennedy on Epidemic Cholera, Vol. xxviii.

Having enjoyed ample opportunities of inspecting the bodies of those who died of cholera, in consequence of his having the medical charge of the convicts at Darwar, he has supplied more decisive information as to its morbid appearances than is to be found in most prior authors. He states that an invariable appearance, even in the cases where no vomiting and little or no purging occurred before death, and where the patients died apparently of mere collapse, was the presence of a large quantity of a transparent or turbid fluid, sometimes colourless, sometimes gray, brown, or red, together with a whitish, opaque, viscid, flaky substance, either floating in the fluid, or adhering to the membrane. This mixed matter, which all authors describe as composing the evacuations during life, and the contents of the alimentary canal in the dead body, Dr Christie represents as invariably present in genuine cases of epidemic cholera. Its exact nature, as we formerly had occasion to regret, has not been determined by any author previous to him; but the deficiency has been in great measure supplied by his researches; for he has found by chemical tests that the fluid part of the matter is serum coagulable by heat, and the insoluble flaky matter modified fibrin. A fuller analysis might have been desirable, but still his experiments render the accuracy of these conclusions exceedingly probable. The mucous membrane of the stomach and intestines was by no means always red. On the contrary, it was more frequently of an unusually white appearance, and at the same time commonly pulpy and easily detached from the subjacent coats. This state of the mucous membrane he considers to be the condition proper to it when it is discharging the sero-fibrinous secretion; and the redness occasionally remarked in scattered patches appeared to him to be either pseudo-morbid, or when really inflammatory, to be the effect of irritating remedies or of the natural tendency of the disease to end in inflammation if it continues long.

The white pulpy state of the membrane, united with the profuse sero-fibrinous discharge is viewed by our author as a disorder differing from inflammation, and analogous to the catarrh of other mucous membranes, which he in like manner refuses to regard as inflammatory in its nature. In short, according to Dr Christie, the mucous membranes generally are liable to two acute diseases, catarrh and inflammation, which are apt to pass into one another, but are nevertheless two distinct affections,—the former being characterized by profuse secretion without redness, the latter by redness and the other concomitants of vascularity, with or without increased secretion. He has detailed some experiments he made with various irritating substances in support of these views; and shows from them that catarrh is produced by the same irritating causes which induce inflammation, but applied in a milder form or for a shorter period of time.

The inner surface of the alimentary canal was not the only quarter where our author found the mucous membranes affected in epidemic cholera. The inner surface of the urinary bladder was also frequently seen lined with the peculiar white flaky matter; and in not a few instances he also observed a sero-fibrinous secretion thrown out abundantly into the bronchial tubes. There is therefore, he thinks, in this disease a tendency to an increased and depraved secretion, or *catarrh*, of the whole mucous membranes; which, however, is developed more especially in the lining membrane of the stomach and intestines.

All the other symptoms remarked in cholera are, he conceives, exactly such as might be expected to follow such an affection. The increased secretion over so extensive a surface as that of the alimentary mucous membrane occasions a great determination and accumulation of blood internally. Hence the paleness of the skin and shrunk appearance of the body. This determination of the blood inwards necessarily renders the oxigenation of the blood less perfect, because too great a quantity of it is accumulated in the lungs, and it has not free access to the air, on account of the sero-fibrinous matter effused in the air-cells. Hence the blood becomes generally black and thick as if imperfectly arterialized. The good effects of blood-letting are owing partly to its lessening the excited state of the vessels of the secreting membrane, partly to its tendency to equalize the circulation by producing a determination towards the surface. The good effects of opium and of the permanent stimulants is owing to their tendency to check catarrhal discharges in general,—a tendency which in the instance of opium particularly is well marked and universally acknowledged. Calomel operates beneficially in a somewhat similar manner. It does not act in this disease as a sedative, which some eastern practitioners have conceived. On the contrary, the mucous membrane is stimulated, as may easily be seen from its red state after death wherever the calomel has remained long in contact with it; and the membrane, in consequence of passing to this particular stage of excitement, ceases to be any longer capable of keeping up the catarrhal secretion. Such at least appears to be the explanation of the mode in which the author conceives that the natural secretion is restored by the action of calomel.

Not the least instructive part of Dr Christie's work is his account of some experiments he made with various irritant poisons, with the view of illustrating the relative effects of temporary and continued stimulation of the alimentary mucous membrane. These experiments were performed with tartar emetic, corrosive sublimate, and calomel. With respect to the two first, he found, that, when they were given to animals in moderate doses, and allowed to be discharged by vomiting, the mucous membrane, if examined soon afterwards, by killing the animal and inspecting it immediately after death, was seen of a white colour wherever the poison had acted on it and produced increased secretion from its surface. It is well known that in larger doses, or when retained in the stomach by a ligature on the gullet, these poisons by their continuous operation produce redness, and all the other phenomena of true inflammation. In like manner, he found that when a large dose of calomel, such as two drachms, was given to a dog, and the animal was killed in twenty hours, the stomach and intestines generally were filled with mucus, and the latter also with dark secretions; while the mucous membrane itself was every where white, except where the calomel had adhered firmly to it; and there it was red. These relative effects of temporary and continuous irritation are conceived by our author to constitute the two diseased states of the membrane, catarrh and inflammation. He adds, that the former state may be caused to such a degree by the ordinary irritants, as to resemble exactly the phenomena of cholera. He has occasionally given in a single dose a scruple of tartar emetic in cases of pneumonia; and has generally remarked, that it produced several attacks of serous vomiting, and a few copious watery stools, accompanied by coldness of the skin, small pulse, and much debility. But in one instance these symptoms were so violent, "that a person unacquainted with the circumstances of the case might have almost mistaken it for a case of cholera."

In his treatment of epidemic cholera Dr Christie agrees with the other eastern physicians, whose methods we have noticed fully on former occasions. Blood-letting, calomel in large doses, opium, vesication by hot water, external warmth, and stimulants, are all employed by him according to circumstances.

Art VII.—1. *Commentarius de Phlegmasia Alba Dolente.* Auctore Joanne Ludovico Casper, M. et Ch. Doctore. Halæ, 1819.

2. *An Essay on the Proximate Cause of the Disease called Phlegmasia Dolens.* By David D. Davis, M. D. Medico-Chirurgical Transactions, Vol. xii. pp. 419. London, 1823.

3. *Recherches et Observations sur la* Phlegmatia Alba Dolens. Par M. Velpeau, Agregé et chef de Clinique à la Faculté de Medecine de Paris. Archives Generales de Medecine Tome vi. A Paris, 1824.

4. *A Contribution to the Pathology of Phlegmasia Dolens.* By Robert Lee, M. D., Physician-Accoucheur to the British Lying-In Hospital. Medico-Chirurgical Transactions, Vol. xv. Pp. 132. London, 1829.

THE history of the Swelled Leg of puerperal females affords an instructive example of the difficulty of coming to positive conclusions on subjects involving a question of facts, without obtaining the direct evidence of necroscopic inspection. Waiving the idle idea which the Continental accoucheurs derived from the humoral pathology, that it was the result of a metastic deposit of milk,—while Mr White ascribed it to obstruction, extravasation, and accumulation of lymph in consequence of previous rupture and reunion of the lymphatics of the pelvis,* Mr Brandon Trye, who denied the occurrence of rupture of these vessels from any other cause, save those which rupture the vessels of a part in general, sought the explanation of the phenomena in inflammation of the lymphatic glands or their vessels, which he imagined was adequate to produce obstruction to the flow of their contents, and distension thereby.†

As if to demonstrate the facility of drawing a distinction where there was no real difference, and constructing a theory in which there was nothing new but the method of proposing it, Dr Ferriar undertook once more to refute the idea of rupture and re-union, and to maintain the influence of inflammation of the lymphatics in inducing a disorder most easily removed by local blood-letting.* That in this defence no mention is made of the Essay of Mr Brandon Trye is singular, when it is considered that Dr Ferriar's observations were given to the public at least six years after the date of that Essay, and must be ascribed to that want of knowledge which is occasionally favourable to discoveries and new theories. Even with the aid of this auxiliary, however, the theory of lymphatic obstruction or lymphatic inflammation was not suffered to remain in undisturbed possession of the ground. Dr Hull, after demonstrating the insufficiency of every hypothesis advanced previously to explain the phenomena of the disease, undertook to give a fuller, and, as he imagined, a more accurate history of it, and to show that its proximate cause consists in inflammation of the muscles, cellular membrane and inferior surface of the skin, extending in some rare cases to the large blood-vessels, nerves, and lymphatics, and producing sudden effusion of serum and coagulable lymph from the exhalants into the cellular membrane of the limb.† Notwithstanding the zeal and ingenuity with which this view of the nature of the puerperal swelled leg was defended, it does not appear to have procured very general assent, except in one instance to be afterwards mentioned; and most persons who spoke and wrote of the disease, both in this country and on the continent, continued to regard it as dependent on some affection of the lymphatic system of vessels. Such appears to have been the idea of Wyer, Home, and Sankey, and of Assalini, Hampe, Westberg, and Lodemann. That it is not even mentioned by Soemmering in his elaborate view of the diseases of the absorbent system, is perhaps to be ascribed to his imperfect acquaintance at the time with the arguments of White and Trye. By Goodlad, who at a late period wrote on the same subject, it is noticed only to be disbelieved. The opinions of Callisen, the professor of Copenhagen, were divided between metastatic deposition and retention or impeded absorption of inspissated lymph.

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* An Inquiry into the Nature and Cause of that Swelling in one or both of the lower extremities which sometimes happens to lying-in women. By Charles White, Esq. F.R.S. Warrington, 1784. An Inquiry into the Nature and Cause of that Swelling, &c. Part ii. By Charles White, Esq. F.R.S. &c. Manchester, 1801.

† An Essay on the Swelling of the Lower Extremities incident to lying-in women. By Charles Brandon Trye, Member, &c. London, 1792.

Of the authors now mentioned, it is a general character that they appear to have been much more solicitous to refute the opinions of each other, and maintain their own by ingenious reasoning, than to attempt to ascertain how far they accorded with the actual facts. The principal evidence by which any of them is upheld consists in demonstrating, from the anatomical relations of the pelvic viscera, and the anatomical characters of the lymphatic vessels, that they are or may be respectively the seat of the disorder in question. By none of them is any dissection given; and in the only fatal case which is recorded by Dr Hull, no inspection of the parts took place.

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* Medical Histories and Reflections, vol. iii. Warrington, 1798.

† An Essay on Phlegmatia Dolens, &c. By John Hull, M.D. Manchester, 1800.

It is therefore not without justice remarked by the author of the last mentioned dissertation, that, previous to the time at which the essay of Dr Davis appeared, the opinions of authors on the nature of the swelled leg of puerperal females were little else but mere speculations, unsupported by facts. It is impossible, indeed, to refuse to the reasonings of White, Trye, Ferriar, and Hull, the merit of great ingenuity; but it is equally impossible to resist the conclusion, that, ingenious as they were, the main cause of the diversity of opinion entertained by these authors, is the circumstance, that they rested satisfied with showing what, in the judgment of each, was adequate to explain the phenomena of the disease, without attempting to show what really caused these phenomena. For this neglect indeed an apology may be found in the want of opportunity rather than in that of inclination. The swelled leg is not a fatal disease; and unless in some rare instances in which death may take place from other causes in persons stili affected with this, or recently after recovery, the evidence of necroscopic inspection cannot be obtained. Better fortune has attended the physicians of the present day. Though it is to be hoped that *phlegmasia dolens* is not more fatal than it was thirty years ago, opportunities of inspecting the bodies of persons who have laboured under its effects are more frequent; and if the facts developed by this means be not adequate in the estimation of all judges to explain the phenomena of the disorder, they may, by the light successively shed on it, eventually enable us to frame correct ideas of its pathology.

For attempting to remove part of this difficulty, the first author on the list is entitled to the notice of the pathological inquirer. After a distinct account, and rather a judicious enumeration of the opinions of different authors on the pathology and best mode of treating *phlegmasia dolens*, Dr Casper illustrates his general statements and reasonings by the details of three cases, and the inspection of one. In this, besides other morbid changes not necessarily connected with the disease, the broad ligaments of the uterus are said to have been highly vascular, the internal surface of the womb was of a dirty green colour, soft, gangrenous, and fœtid, and its orifice, with the vagina, was swelled, livid, and proceeding to gangrene. The cellular membrane of the limb was loose, and filled with a brown inodorous fluid; the inguinal glands were more abundant, and larger than usual; and the muscles were very flaccid, both in the legs and in other parts. The large blood-vessels, which were carefully laid open, were entirely sound, both in their outer and their inner surface; and the crural and ischiatic nerves, exposed in like maner, were neither swelled, reddened, nor unusually changed. It must be further mentioned, that the morbid state of the cellular tissue was observed, not only in the legs but in the pelvis, as far as the *psoas magnus* and *iliacus internus*.

From the facts here disclosed, and from the phenomena observed during life, more especially in a case recorded by Wyer in the Medical and Physical Journal for 1810, Dr Casper infers that the puerperal swelled leg consists in inflammation of the system of the absorbents; in some cases with a simultaneous affection of the cellular tissue. This view of the nature of the disease differs from that of Dr Hull, it may be remarked, chiefly by representing the affection of the cellular tissue as more rare, and that of the absorbents as more frequent, and by excluding entirely that of the blood-vessels. Though the evidence of this single case is too important to be overlooked, it is certainly unlucky that the author had not been able to adduce more than this on a point which is so liable to be misunderstood.

The cases given by Dr Davis lead to a very different view of the origin of the disorder. Of four inspections of the persons of females who died while under the disease, in the first the external and common iliac veins contained red coagulated laminated matter, like that of an aneurismal sac, with a teaspoonful of thick brownish-red fluid termed *pus* in its centre; in the second, the inner surface of the left external iliac and attached part of the femoral vein was studded by deposites of adherent lymph; in the third, the femoral veins, the iliacs, and part of the *vena cava*, contained adherent layers of clotted blood, and the coats are represented to have been highly inflamed, and attached to the surrounding parts; and in the fourth case, the left external iliac contained a firm coagulum adherent to part of the common iliac, the left internal iliac was greatly inflamed and contracted, and the right iliac was occupied by a similar coagulum, communicating with that of the left.

From the facts disclosed by these cases, Dr Davis thinks himself justified in inferring, "that the proximate cause of *phlegmasia dolens* consists in violent inflammation of one or more of the principal veins within, and in the immediate neighbourhood of the pelvis, producing increased thickness of their coats, the formation of false membranes on their internal surface, gradual coagulation of their contents, and occasionally destructive suppuration of their whole textures." If this be admitted to be established, little doubt can remain as to the consequences which Dr Davis thinks must result, viz. that the diameters of these vessels must be so diminished, sometimes so obstructed, as to become mechanically incompetent to convey into their corresponding trunks the venous blood brought by their inferior tributary branches.

Waiving, however, the necessity of inflammation to account for the appearances found on dissection in these cases, it may become a matter of doubt whether these appearances, in every one of the cases, really indicated the previous existence of inflammation of the venous tubes. It is true we have the testimony, or rather opinion, of Mr Lawrence, that the appearances in the first case were proofs of the existence of this process; and in the second we are assured that the interior of the vein was studded by spots of lymph. Independent, however, of the fact, that in the first case the appearances are not altogether satisfactory, and that in the second the vessel was not obstructed, in the third and fourth the bloody clots which the veins contained might have been owing to mere stagnation of their contents; and no proof is given of the existence of inflammation as found in other venous tubes, except the general assertion that they were inflamed. However willing we may be to allow some weight to the presence of bloody clots in various degrees of consistence, we feel it impossible, when we remember what we have seen in the interior of veins unequivocally inflamed, to assent to the general inference of the author, that they indicate positively and absolutely the existence of that process.

A view, neither precisely the same nor totally different, but somewhat modified, is given by M. Velpeau, in the observations which constitute the third article of our list. From three cases with necroscopic reports, M. Velpeau gives the following statement of the progress of the phenomena which constitute this disease. At variable periods after confinement, pains begin to be felt deep in the pelvis, shooting to the pubes, aggravated by motion, and accompanied with fever. These after continuing for some time may disappear entirely, or become more severe, with swelling of the limb, pains in the site of the pelvic junctions, and even a feeling as if the bones of the pelvis were to give way and fall asunder. At length, after this state continues for some time, with more or less exhaustion and loss of the general powers, death ensues. Inspection shows in the symphyses ichorous reddish purulent matter; the articulations or pelvic junctions separated and moveable, and their surfaces injured by morbid action; the periosteum, and the ligaments of one or other junction detached, thickened, and blackened on their inner surface with reddish purulent matter; the parietes of the corresponding iliac vein thickened and indurated, and its cavity, with that of the deep pelvic veins, filled with genuine purulent matter from the groin to the foot; and, finally, many minute abscesses formed in different parts.

It appears, therefore, he argues, that in *phlegmasia dolens* the attention of the pathologist is directed to one of two circumstances, the affections of the pelvic junctions, or the disease of the veins. In the first case we have both combined in an exquisite degree. In the second, though the veins contain purulent matter mingled with blood, this is free, and appears to have been conveyed thither by absorption, the veins being inflamed, while the affection of the pelvic articulations is the same. Even many of the lymphatics in this case contained purulent matter. In the third case again, though the veins are little, scarcely at all, changed, except around a laceration of the pelvis and an abscess formed between this canal and the rectum, the anterior symphysis is relaxed, and the fibres of the inter-pubal ligament are separated; that of the left sacro-iliac junction is detached, and between the separated bones is found yellow-reddish liquid purulent matter; and the cartilages were diseased, and partook of the same colour.

In the midst of these discordant facts M. Velpeau arrives at the following conclusions: 1*st*, the acute swelling of the limbs in puerperal females may be ascribed, in some instances at least, to inflammation of the pelvic symphyses or of the veins. 2*d*, On the contrary, the phenomena observed during life might be ascribed to a severe lesion of the deep-seated veins as well as to that of the lymphatics. 3*d*, It is yet to be ascertained whether the last system of vessels is truly the cause of *phlegmasia dolens*. And 4*th*, Diseases totally different in nature have been classed under the same head, and have in this manner tended to throw confusion on a subject which is not very clearly described by various authors.

Independent of the fact, that these inferences by no means flow directly from the facts given by the author, it is further to be observed, that if they do not positively militate against the views of Dr Davis, they by no means tend to confirm them. In the two first cases there were so many different lesions, that it is not easy to determine which was primary and which secondary; and though we do not agree with the author in saying that in the second the presence of purulent fluid in the veins did not indicate inflammation, we are astonished that, in defiance of this conclusion, he afterwards maintains that *phlegmasia dolens* may be justly ascribed to a severe lesion of the veins. The third case, it is manifest, cannot be made to favour these views, since the author himself admits that the veins, if not sound, were not sufficiently diseased to account for the phenomena. Upon the whole, it may be justly asserted, that the cases are neither sufficiently numerous, nor sufficiently distinct, to justify very positive conclusions.

It remains to be seen whether the facts adduced by Dr Lee be adequate to supply the defect of evidence now remarked. This observer gives the details of five instances of the disease; and in the first of these the necroscopic report of the appearances, as they were observed after death, which took place eleven months after the attack of *phlegmasia dolens*. This case, which is so much more valuable that, during life, in the situation of the femoral vein, there was distinctly felt a thick hard cord about the size of the little finger, exquisitely sensible, rolling beneath the touch, and capable of being traced three or four inches down the thigh in the course of the femoral vessels, is in other respects so distinctly described, that we give it in the words of the author.

> "The whole of the left inferior extremity was considerably larger than the right, but no serous fluid escaped from the incisions made through the integuments, beneath which a thick layer of peculiarly dense, granular, adipose matter was observed. The common external iliac and femoral veins and arteries, enclosed in their sheath, were removed from the body for examination. The common iliac with its subdivisions, and the upper part of the femoral veins so resembled a ligamentous cord, that, on opening the sheath, the vessel was not, until dissected out, distinguishable from the cellular substance surrounding it. On laying open the middle portion of the vein, a firm thin layer of ash-coloured lymph was found, in some places adhering close to and uniting its sides, and in others clogging it up, but not distending it. On tracing upwards the obliterated vein, that portion which lies above Poupart's ligament was observed to become gradually smaller, so that, in the situation of the common iliac, it was lost in the surrounding cellular membrane, and no traces of its entrance into the vena cava were discernible. The vena cava itself was in its natural state. The entrance of the internal iliac was completely closed, and in the small portion of it which I had an opportunity of examining, the inner surface was coated by an adventitious membrane. The lower end of the removed vein was permeable, but its coats were much more dense than natural, and the inner coat was lined with a strong membrane, which diminished considerably its calibre, and here and there fine bands of the same substance ran from one side of the vessel to the other. The outer coat had formed strong adhesions with the artery and the common sheath. The inguinal glands adhered firmly to the veins, but were otherwise in a healthy condition." Pp. 7, 8.

It must not be denied that this case is decidedly the most distinct and unequivocal yet adduced, to prove the dependence of the phenomena of the swelled leg on obstruction of the pelvic veins. The facts themselves are more precise than those either of Dr Davis or of M. Velpeau, and are not liable to the same objections. That in this case, therefore, the affection of the femoral vein remarked during life, and the effects of which were demonstrated after death, was connected with the attack of *phlegmasia dolens*, must be admitted. Whether it was necessarily connected in the mode of cause and effect, must depend very much on the evidence of cases to be afterwards adduced.

Against this, however, we have the positive case of Dr Casper, and the negative one which forms the third of M. Velpeau. To the first Dr Lee replies, that it is a case not of *phlegmasia dolens*, but of inflammation of the cellular membrane entirely. We would willingly, for the sake of uniformity in the evidence, adopt this supposition; but after examining the account of this case once more, it appears to us quite as much entitled to the character of *phlegmasia dolens* as any of those hitherto recorded. Of the case of Velpeau it is more easy to dispose; for the swelling in this case might have resulted from pressure exterior to the veins, the operation of which from the account appears not to have been wanting.

Since the publication of the case now mentioned, Dr Lee has ascertained, from two cases in which he had an opportunity of inpecting the parts after death, that the disease originates in the uterine branches of the hypogastric or internal iliac veins, and thence extends to the iliac and the great venous trunks of the inferior extremities. From this he infers that uterine *phlebitis* and *phlegmasia dolens* are mere modifications of the same disease. To this we may advert afterwards.

Though Dr Lee does not adduce any other necroscopic evidence to corroborate his theory of the swelled leg, the accurate manner in which he has traced the progress of the phenomena of the disease in these cases, furnishes evidence of the strongest nature, next to that of inspection. Thus, in the first of these cases, on the fourteenth day after delivery, and the third of the disease affecting the right limb, there was exquisite pain, aggravated by pressure, in the course of the femoral vein, which in the groin felt as if enlarged, rolling, hard, and incompressible under the finger. On the third day after this the swelling had increased so much that the vein could no longer be felt. In three days more, when the swelling had diminished, the indurated vein was again felt in the groin. But at the same time a similar disease was beginning to affect the left leg; and the left femoral vein was now felt enlarged and indurated in the groin, and intensely painful through its course, as far as the ham. The disease proceeded, and the patient recovered; but up to the date at which the paper of Dr Lee was published, a space of nearly fourteen months, the limbs continued painful, and swelled occasionally, and the superficial veins were unusually large, numerous, and distinct.

In the three cases given in the appendix, though pain was felt in the veins, Dr Lee acknowledges, nevertheless, that the degree and kind of swelling supposed to be characteristic of *phlegmasia dolens*, did not take place. In these cases the inflammatory process, which the author places in the vein, commenced with pain in the situation of the iliac and femoral veins. In the second, the inflammation, instead of pursuing the course of the femoral vein down the thigh, appeared to be arrested at the junction of the internal *saphena* with this vessel, and to have proceeded along the trunk and branches of the superficial vessel to the foot. These painful affections of the lower extremities, without general swelling, Dr Lee regards as varieties or slighter degrees of the same disease, and he ascribes the absence of general swelling of the limbs to the slight degree of inflammation and obstruction which existed in the iliac and femoral veins.

From this short sketch we believe it cannot fail to appear, that the facts adduced by the last mentioned author are unquestionably the strongest and the least equivocal, in corroboration of the opinion that *phlegmasia dolens* depends on obstruction arising from inflammation of the pelvic veins. They nevertheless do not amount to complete evidence that these two circumstances are uniformly and invariably connected as cause and effect; and if we mention in this place a few of the defective points in the chain of evidence, it is with the hope that they may attract the attention of the author himself, and that, by removing the objections to which they give rise, he may render his views of the pathology of this disease at once complete and unobjectionable.

The hypothesis of *phlegmasia dolens* now proposed is liable to two principal objections. In the first place, it may be asked, does inflammation of the pelvic or uterine veins always and constantly produce the swelled leg? Is it certain that these veins are never inflamed without being followed by swelling of the lower extremity? It is well known that inflammation and suppuration of the uterine veins are not uncommon, or rather are common, in uterine peritonitis, and other inflammatory affections of the sexual organs of the female. These vessels Dr Clarke and Mr Wilson found filled with purulent fluid or lymph, or both, in the persons of females cut off by puerperal fever; and in two fatal cases of the same disease, Dr Craigie saw these veins containing purulent fluid. Though it may not be justifiable to infer from these cases that the uterine veins are always inflamed in uterine peritonitis, nor would it avail in fatal cases of this disease to say that they were, at least in reference to *phlegmasia dolens*; yet since it is certain that it occurs in bad cases, it is reasonable to believe that moderate inflammation of these veins takes place in those which recover. If this be accurate, swelled leg ought to occur in every woman who has had puerperal fever. Yet in how few females affected with peritoneal or pelvic inflammation do we find the swelled leg take place. The rarity of the disease is remarkable; and while pelvic or uterine inflammation is by no means uncommon, the former is supposed to vary from 1 in 200, which is the most frequent, to 1 in 2000, which is the most rare.

In the second place, it may be argued against this hypothesis,—venous inflammation is an exceedingly dangerous and fatal disease, so much so, that it is doubtful if recovery has taken place when it has once been established. Puerperal swelled leg, on the contrary, is so far from being dangerous, that it is rare indeed to see any one die of that alone. One case, indeed, is recorded by Hull. Puzos also appears to have seen it prove fatal. If the case recorded by Zinn in the Gottingen Acts be admitted to belong to this head, that is another example of fatal termination; and that recorded by Casper forms a fourth. The greatest mortality from that disorder is in the cases recorded by Dr Davis; and this alone might with some persons form an argument that these were not pure examples of *phlegmasia dolens*, but complicated with disease more certainly fatal. But whatever opinion be entertained of these cases only, the difficulty remains, to explain how a morbid process, so uniformly fatal as that of venous inflammation, should cause the phenomena of a disease so slight and so free from danger, in general, as the puerperal swelled leg. The only mode of reconciling the facts would be to prove that venous inflammation occasionally terminates in resolution, and that pure *phlegmasia dolens* is sometimes a fatal disorder. This the advocates for the theory now proposed have not yet achieved; and we trust that Dr Lee, who has contributed so much accurate evidence on this question, will succeed in adducing facts sufficiently numerous and sufficiently strong to accomplish this also. The moment that this is done we conceive the point is decided, and the question set at rest for ever.

Art. VIII.—1. *Observations on Painful Subcutaneous Tubercle, with Histories and Cases of the Disease.* By William Wood, Fellow of the Royal College of Surgeons, and F. R. S. E. Pp. 50. (From the Medico-Chirurgical Transactions of Edinburgh, Vol. iii. Part ii.)

2. *Observations on Neuroma, with Cases and Histories of the Disease.* By William Wood, F. R. S. E. &c. Pp. 67. From the Medico-Chirurgical Transactions, Vol. iii. Part II. Edinburgh, 1829.

Though the existence of painful minute tumours in the subcutaneous cellular membrane appears to have at different periods been casually observed by anatomists and surgeons, to Mr Wood belongs the merit of first directing attention to them as constituting a peculiar organic disease, with appropriate characters, and requiring the interposition of surgery. The papers which Mr Wood published in the eighth volume of this Journal contain the principal facts, pathological and practical, which were then known, and such a sketch of the literary history of the diseases as could at that time be framed.

Since the period at which these papers were communicated to the profession, three cases recorded in the same work by Dr Marshall Hall, Mr Windsor, and Mr Laing, a case by Mr Swan in his dissertation on the local affections of the nerves, and the knowledge of various cases recorded by Mojon and Covercelli, Neumann, Siebold, Alexander, and Descot, with general notices of the disease in the writings of Portal, Monteggia, and others, have added considerably to the information originally given by Mr Wood. Induced by these circumstances, Mr Wood has once more resumed the subject, and given a very complete account, pathological and practical, of this singular disease.

In the course of the literary history of the disease, he follows the steps of Alexander, in tracing it from Vigo and Ambrose Paré to Cheselden, Camper, Portal, Odier, and Monteggia. Adopting the general division suggested by Dr Craigie, Mr Wood continues to distinguish the minute tubercle by the same name by which he originally designated it, and seems to regard the opinion originally proposed by Camper, that they are seated in the subcutaneous nerves, as more probable than at the date of his first communications. To this view, which was then certainly less susceptible of proof, Mr Wood has been led partly by considering the effects of injuries on the nerves, and the symptoms recorded by different observers in the recorded instances of this disease, and perhaps chiefly by those of the cases of Dr Thomas Shortt, and of Mojon and Covercelli, mentioned in a former number of this Journal. In equivocal cases the evidence furnished by those which are undoubted may be justly allowed to regulate our conclusions.

"In regard to the nature of the tumour,—the opinion originally formed by Camper, that it depends upon a diseased enlargement of a portion of a subcutaneous nerve, has been almost universally adopted; and, from the nature of the symptoms, from their strong resemblance to those of Neuralgia, and to those arising from injuries done to the small subcutaneous nerves, as well as from the observations of several of the writers who have particularly examined the diseased part, there seems little reason to doubt the accuracy of the opinion. It is, however, very desirable that minute and accurate examinations of the tubercles, and surrounding parts, should be made, when opportunities occur of doing so; with the view of ascertaining, if possible, whether the diseased alteration of structure takes place in the neurilema, or within it; or whether it may have originated in the contiguous textures, and become afterwards connected with the nerve.

"I am inclined to suspect that the very minute account of the structure of the tubercles given by some writers, has been drawn rather from a supposed analogy between them and the larger tumours connected with the nervous trunks, (in which the parts are much more distinct,) than from accurate observation: at least, in such examinations as I have been able to make, during the removal of the tubercle, or more carefully afterwards, I have found only a firm, whitish, homogeneous body, of a fibro-cartilaginous appearance; and I can hardly suppose it possible to discover, in a tumour of the size of a pea, or of a bean, connected with a twig of a nerve so small as generally to escape observation (if, indeed, it be so connected), that the diseased part had existed 'in the substance of the nerve itself, of which the fibrils had been separated from each other, and had surrounded the tumour.' This description, however, I believe to be quite applicable to many of the larger tumours of the nervous trunks." Pp. 42, 43.

In the second essay, Mr Wood properly distinguishes from the minute tubercle (*Neuromation*,) the large tumour incident to nervous trunks or chords, originally termed *Neuroma* by Odier. To illustrate the nature of this form of the disease, Mr Wood adduces the cases of Pring and Sir Everard Home, and quotes in an appendix the details of 24 cases from Cheselden, the *Encyclopedie Methodique*, Home, Odier, Spangenberg, Siebold, Alexander, Mr Charles Bell, Dr Denmark, Pring, Grainger, Mr George Bell, Aronssohn, Descot, Dr Craigie, Mr Syme, and Ollivier.

The following extracts will show the general conclusions which Mr Wood thinks may be derived from the phenomena of these cases.

"Tumours connected with the nerves, when carefully examined, after being removed from the body by operation, or after death, are found to exhibit very different appearances in different cases; the variety depending, in a great degree, probably, upon the original seat of the disease, and also upon the state of progress of the tumour."

"Sometimes, though rarely, the diseased mass seems to consist almost entirely of a cyst containing a fluid; as in the case operated on, and reported by Cheselden. At other times, it is in part solid, and in part fluid; more frequently it is solid throughout. In one of the cases to be detailed, the tumour consisted almost entirely of a firm membranous cyst, containing a thick fluid; in three it consisted partly of fluid, and partly of a solid substance, of greater or less consistency; and, in twenty, it was entirely of a solid texture. The solid part assumes a different degree of consistence, and a different colour and appearance in different cases; and sometimes in different parts of the same tumour. In some instances the whole mass is very firm and hard, of a whitish or yellowish colour, and of a fibro-cartilaginous appearance, very much like nerve, but harder, and rather more shining, resembling an enlarged ganglion.

" The fibres run generally in a longitudinal direction, but are not always parallel; they seem to be to a certain degree serpentine, and are interlaced by transverse fibres, the interstices being filled up by the substance of the tumour. The fibrous structure is most apparent in the tumours when small. In other cases, one part of the mass is firm and solid, of a reddish colour, and steatomatous appearance; and in another part there are cells of a larger or smaller size, some empty, others containing either a fluid, or a softish medullary looking matter. Occasionally there is a number of small lobes distinct from each other, but closely pressed together, and all of them connected with the affected nerve. In almost all cases there is an appearance of a firm sac, more or less dense, of a shining appearance externally, not unlike tendon; it is generally thinner over the centre of the tumour than towards its extremities; and seems to be formed in part, or entirely, of diseased neurilema. In some cases the sac is loosely attached to the contained parts by thin cellular substance; in others it is firmly incorporated with them; and sometimes it is attached to, or partially covered by muscular fibres. The internal surface of the cyst occasionally, particularly when it contains fluid or soft medullary matter, is soft and pulpy, of considerable thickness, and has very much the appearance of a secreting surface.

" The nerve itself is sometimes sound immediately as it enters and comes out from the tumour; but more frequently it is more or less diseased for some little distance both above and below, being thickened and sometimes redder than natural, so as to exhibit an appearance of inflammation. The nerve can frequently be traced distinctly to the surface of the diseased part, where some of its fasciculi being separated from each other, run into the substance of the tumour, in which, or in the sac, they seem to be lost; but unless the tumour be of very large size, a number of the nervous fasciculi, sometimes a good deal flattened, can be traced in a perfect state of continuity running over its surface, to be connected below with the trunk of the nerve from whence they had arisen. When the tumour is very large, however, none of the nervous fibres can be traced from the trunk above to that below the tumour, there being, to all appearance, a total breach of continuity in the nervous fibres. It is in all probability to be ascribed to the circumstance of the disease affecting only a certain number of the fibres of the nerve, while others are left in a healthy state, although in contact with the tumour, that we are to explain the fact, which seems to have puzzled some of the observers of the disease, that in many instances the powers of sensation and of voluntary motion remain very entire in the limb beyond the tumour. That part of the nerve does remain in a state fit for the performance of its functions when another part is much diseased, is proved by the effect of dividing the nervous trunk in the operation for the removal of the tumour, when the sensation and power of motion of the limb, which had previously been little impaired, became instantly destroyed or much diminished. From the appearance of the internal structure of some of the tumours, they have been supposed to partake of the nature of true scirrhus; but without entering at all into the discussion in regard to the occurrence of cancer in nerves as a primary affection, I may state that there is at least very great reason to doubt of the tumours in Neuroma ever being of a truly scirrhous character; first, because however large the diseased mass is, or however long it may have existed, the contiguous textures, and more particularly the skin, do not become affected with disease of a malignant kind; and, secondly, because there seems to be no tendency to a return of the complaint after it has once been removed by operation." P. 10—14.

The only remedy is extirpation by the knife, as is well illustrated by the case of Dr Gibbs in the present Number.

These essays exhibit excellent examples of the best mode of illustrating the history and pathology of obscure diseases. The task which Mr Wood originally undertook of making the nature of this complaint, which appears to be not uncommon, familiar to the profession, may be now said to be completed. In the cases and dissections detailed, the pathologist finds almost every thing at present known on the nature of the disorder; and if any thing more is yet to be learnt on this subject, it must be chiefly by confirming some of the few points which are not positively ascertained.

Art. IX.—*Observations on Derangement of the Digestive Organs, and on their connection with local complaints.* By William Law, Esq. F. R. C. S. E. Second Edition, enlarged. Pp. 208. Edinburgh, 1829.

Of this small work, which is the second edition of the Observations of Mr Law, the arrangement is more distinct and more accurately observed than before. It consists of eight sections or general heads on the following topics:—Review of methods of treatment; considerations on open and constipated states of the intestinal canal; dyspepsy; miscellaneous observations on food, drink, and medicine, and their effects either on the alimentary canal or the system at large; comparative views of functional and organic disorder; the influence of sleep; the operation of cold; and sympathy, including the influence of moral causes, and of the function of respiration and the air respired, and some other circumstances not referable to any particular head.

In the examination of the several topics, though necessarily abounding with trite and familiar points, some new and rather curious illustrations are adduced, and the reader is occasionally interested by the ingenious application of some common and well known physiological principles. This appears especially with regard to the use of some purgatives and certain articles of food and modes of living in obviating constipation, or preventing its effects. The experiments on the dog and bitch, with the view of demonstrating the respective effects of aloetics and saline purgatives on the different parts of the intestinal canal, though too limited to establish all the circumstances of the conclusions deduced by the author, are useful in confirming the general fact. The remarks on the formation, effects, and management of dyspepsy, though desultory, show that the author has observed several of the varieties of this proteiform disorder with care. The observations on the influence of sleep, and the foul state of the tongue in the morning, would be more useful, if they directed the attention to the diet and digestive process of the previous day. The section on sympathy, if desultory, is at least amusing, by the diversified illustrations which it affords.

The first edition of this work bore much of the character of a commentary on the principles and practice of Mr Abernethy in stomach disorders. In the present Mr Law betrays less of this slavish attachment to the views of another, and shows a greater inclination to think for himself. It is unlucky, however, that, notwithstanding this renunciation of allegiance to one divinity, the author has been unable to divest himself of his respect for another. We fear Mr Law will actually congratulate himself, when we tell him, that his mode of thinking and expressing himself bears some distant resemblance to that of Mr John Hunter. But lest this have an injurious effect, we must add, that his book would be both more useful and more intelligible, providing he could imitate the excellencies of Mr Hunter, and shun his defects. Mr Law, we think, has much to learn both in precision of thinking and arrangement of his thoughts; and if they were expressed in the ordinary way, it could not injure the value of the materials.

PART III.

MEDICAL INTELLIGENCE.

PHYSIOLOGY.

On the Functions of the Liver and Intestines in the Fœtus, by Dr R. Lee. (Phil. Transactions, 1829.*)*—In this paper the chief object of Dr Lee is to prove that the liver of the fœtus secretes an albuminous matter, which being afterwards digested in the duodenum and ileum, supplies nourishment during the period of uterine life. The great size and early developement of the liver in the fœtus has been long well known. The intestines also, which are formed at an early period, attain in a short time an extent which is much greater than these organs possess, in proportion to the size at any future period of adult life. In a fœtus of 8 months, the length of whose body was 18 inches, Dr Lee found the small intestines, when measured, to extend to 9 feet 6 inches, and the great intestines to be 2 feet; and from other examinations, he estimates the entire length of the intestinal canal of the fœtus at the full period at about 11 feet, an extent which, in proportion to the size of the body, is much greater than in the adult. The difference of proportion in the fœtus and adult is in short as $7\frac{1}{3}$ to $5\frac{1}{2}$ or 6. Not only, however, is this part of the canal more fully developed in the fœtus than other parts, but the colour of its upper extremity is more vascular than that of the other parts. The mucous membrane of the duodenum and upper portion of the ileum is of a bright rose red, while that of the stomach, lower part of the ileum and colon, is comparatively pale and bloodless.

In more than 20 fœtuses examined by Dr Lee, he found the contents of this extensive tube both in appearance and chemical composition, as determined by Dr Prout, to bear a close analogy to the contents of the alimentary canal of the adult, where the processes of assimilation and absorption are performed. Thus, while in the stomach was found only semitransparent, ropy, mucous, and occasionally acescent fluid, without albuminous matter, the duodenum and upper part of the ileum invariably contained an orange or pink coloured semifluid matter, which possessed distinct albuminous properties. This matter is most abundant round the papillary process, through which the common duct of the liver opens into the duodenum. In the lower half of the small intestines its quantity diminishes; and near the colon it almost entirely disappears. The colour of the contents of the lower end of the ileum is also different from that of the duodenum and upper end, being greenish, and assuming the characters of meconium as it approaches the beginning of the colon. These substances give traces of acescency. The colon, which was more distended than the ileum, contained a dark-green homogeneous fluid, which is either neutral or slightly alkaline, and which gives no trace of albuminous matter.

From the absence of albuminous matter in the fœtal stomach, its presence in the upper half of the small intestines, its diminution in the lower end, and its disappearance in the colon, connected with the length of the intestinal tract, Dr Lee inferred that the absorption of some nutritious substance from the canal takes place during fœtal life, as it does in the adult. The source of this albuminous matter, which he was thus led to seek, he inferred must be either in the pancreas, the liver, or the duodenum. The first organ, however, was too small for this purpose; it was difficult to think that the latter should both secrete and absorb; and the liver remained as the only source from which it could be derived—an inference which appeared to receive strong confirmation from the extraordinary size of this organ, and the abundant supply of blood which it receives directly from the umbilical vein. This idea was confirmed by detecting in two instances in the hepatic duct the presence of a fluid possessing not only the sensible but the chemical properties of that found in the duodenum. Though in general the hepatic and common ducts have been found empty, or have contained a quantity so minute as to preclude chemical examination, in these two instances it was abundant, and was pressed out on a glass plate, without mixing with the bile of the gall-bladder, a ligature being previously applied to the cystic duct. The fluid thus obtained was of a light straw colour, and much less viscid than that covering the inner surface of the duodenum; and its properties were still more distinctly albuminous than those of the intestines. From these several facts, Dr Lee infers with much probability, that the function of the fœtal liver is not merely to separate from the blood an excrementitious fluid, which, if retained, is injurious to the infant, but that it further supplies matter, which, by its albuminous properties, may undergo digestion, and afford nourishment.

The presence of albuminous matter was indicated in the experiments instituted on this substance by Dr Prout by dilute acetic acid, the most unequivocal test of that principle, and also by heat, by oxymuriate of mercury, &c. Besides albuminous matters, however, there were others to which this character could not be applied, and for which Dr Prout thinks it difficult in the present state of animal chemistry to find a precise term. A large proportion of them appeared nearly allied to mucus and bile, though they did not agree with these substances as they occur in the adult state.

These views furnish an ingenious explanation of some curious and obscure facts regarding the size of the fœtal liver, and the uses to which its abundant supply of blood may be subservient.

PATHOLOGICAL CHEMISTRY.

Observations on the Composition of Diabetic Urine. (*Journal de Chim. Méd. Janvier* 1829.)—*M. Chevallier* has lately analyzed the urine of a diabetic patient, and found that the saccharine matter contained in it possessed the property of crystallizing. In this respect it did not resemble the ordinary sugar of diabetes; it bore in fact the closest resemblance to the sugar of beet-root or sugar-cane. The process by which he procured the crystals was as follows. The urine being subjected to a boiling temperature in a retort, albumen was coagulated. This was separated by filtration, and to the clear fluid the subacetate of lead was added in excess. A precipitate which was thus formed was removed, and the filtered fluid was next subjected to a stream of sulphuretted-hydrogen gas to throw down the excess of lead. The resulting fluid was concentrated by evaporation, at first rapidly, then slowly; and in a few days crystals were formed. They had a saccharine taste, were changed by fermentation into alcohol, and gave oxalic acid by the action of nitric acid. When M. Chevallier announced this observation at a meeting of the Academy of Medicine, Vauquelin hinted it was not improbable that the urine of some diabetics might become saccharine in consequence simply of the saccharine principle of the different articles of food passing unchanged by digestion into the blood, and thence into the kidneys. On trying the experiment, however, in a case of *diabetes insipidus*, M. Chevallier found, that although the patient took four ounces of sugar one day, eight the next, and twelve the third day, no saccharine matter could be detected in his urine.

Some remarks on the composition and qualities of diabetic urine have also been made in the same Journal by *M. Barruel.* He shows that *the urine may be strongly saccharine, although not sweet to the taste.* In a sample of diabetic urine which was sent him for analysis he perceived a faint urinous odour and feeble saline taste, without any mixture of sweetness. It contained obviously *albumen*, *phosphate of lime*, and *muriate of soda.* On careful analysis he also procured *urea*, but no *uric acid.* The presence of sugar was proved by the test of fermentation. The urine being heated to the temperature of ebullition, and the flakes of coagulated albumen then removed, the filtered fluid was mixed with yeast, and placed in an apparatus which allowed the gas disengaged to be collected. In three hours fermentation began, in seven hours the evolution of gas was copious, in thirty-six hours it was finished. The carbonic acid gas collected corresponded to a quantity of sugar amounting to an eighteenth of the weight of the urine used; and the fermented liquor when filtered had a strong spirituous taste, and yielded alcohol by distillation. It was in the residue of the distillation that *urea* was detected. This was done simply by evaporating to the consistence of syrup, leaving the liquor exposed to cold air for twelve hours, filtering and adding nitric acid, when abundant crystals of nitrate of urea were formed.

M. Barruel has twice before discovered urea in the saccharine urine of diabetes, and in all the three instances the proportion appeared to him to be as great as in healthy urine. He hence thinks that urea in its usual proportion in all probability is never wanting in that secretion during diabetes.

MEDICAL PATHOLOGY.

Case of Hemorrhage after extraction of a tooth from a hereditary hemorrhœal tendency. (*Rust's Magazin für die gesammte Heilkunde*, xxvii. 375.)—A Jew, 20 years of age, thin cachectic, pale-featured, and of delicate complexion, was attacked with obstinate hemorrhage after the extraction of the first grinding tooth of the right side of the lower jaw. When *Dr Steinmetz*, the physician who relates the case, saw him next day, the blood flowed in a continuous stream, and appeared to issue from the lacerated gum, not from the cavity from which the tooth-fangs had been extracted. An attempt was made to arrest the hemorrhage by squeezing into the cavity a mass of charpie sprinkled with styptic powder, and directing the patient to compress it by keeping his jaw closed. But in two hours he complained that the blood began to trickle into his throat. The charpie was therefore renewed, being previously dipped in dilute sulphuric acid. This plan likewise failed; in a short time the blood began again to fill the mouth. It was again tried, however, but without success; two hours after the second pledget was introduced the blood began to issue from the man's mouth and nose. The charpie was then soaked with concentrated sulphuric acid and also sprinkled with styptic powder, and in order to effect exact compression, *Lampe's* tourniquet for hemorrhage from the tongue was applied to the jaw. During three days this dressing was changed every four or six hours, yet in the end without any advantage. The patient was then ordered likewise to take every other hour from forty to eighty drops of the acid Elixir of Haller; and when this remedy had been persevered in for six-and-thirty hours the hemorrhage ceased materially. For four days more, however, it returned every evening to such an extent as to induce the patient to resume the use of the acid pledgets.

The hemorrhœal tendency in this instance was derived from the grandfather. Several times in consequence of a prick with a pin his grandfather was brought almost to the point of death by hemorrhage. At last he was attacked with pulmonary inflammation after exposure to cold and fatigue. During this attack he had bloody sputa, though not to any great extent. But on the sixth or seventh day he was attacked with profuse epistaxis, which nothing could check, and which consequently proved fatal. The father had in his youth been likewise several times reduced to a state of extreme exhaustion through hemorrhage produced by trifling injuries, and would have perished but for prompt medical assistance. At the age of sixty-five he had been free from the disease for ten years. The son, Dr Steinmetz's patient, had been several times before seized with obstinate hemorrhage from trifling causes. Three sisters were entirely free from the hereditary peculiarity; but they imparted it to their children. One of the children was, at the request of the mother, circumcised in presence of the relater, who had extreme difficulty in checking the flow of blood.

These facts confirm the statements of former authors,—that the hemorrhœal diathesis descends only to the male branches of a family,—that it may be communicated to them through females without these females having it themselves,—and that it ceases in old age.

Observations on Hypertrophy of the Brain. (*Breschet's Répertoire Général d'Anatomie et de Physiologie Pathologiques. 2me Trimestre*, 1828.)—Having given in the last Number of this Journal some account of the observations of M. Mc. Laennec on hypertrophy of the brain, we shall add in the present a short notice of a paper published on the same subject a few months earlier by M. Dance of Paris.

M. Dance and M. Laennec appear to have arrived about the same time, and independently of one another, at a conviction of the existence of this singular disease; and although we are aware that some eminent pathologists entertain doubts as to the reality of its existence, we must say for our own parts that it appears impossible to give any other name to at least some of the cases which the two French authors have described. M. Dance states as the result of his pathological researches on the subject,—that the brain may acquire a faulty increase of nutrition, characterized by flattening and approximation of its convolutions, contraction of the ventricles, unusual whiteness, firmness and dryness of both the medullary and cortical substance without any disorganization, and by dryness of the cavity of the arachnoid;—that the hypertrophy affects the whole brain proper, but not the cerebellum;—that instead of augmenting the energy of the action of the brain, this disease tends on the contrary to diminish, pervert, or suspend it, in consequence of the compression necessarily produced within the skull;—that its formation appears to be gradual;—and that, although it is accompanied, especially towards the close, by violent cerebral symptoms, these are not such as serve to distinguish it from other diseases of the brain. The cases he has published are four in number. The following is an analysis of their particulars.

Case 1.—A lapidary of middle stature and strength, and 26 years of age, after receiving a blow on the head in his fourteenth year, had been always liable to headach in very cold weather. In other respects his health was good, and his intelligence perfect. Three weeks before he came under the care of M. Dance his headach became more frequent and severe, and accompanied with pulsation in the head, tinnitus aurium, loss of sleep, and bilious vomiting. For these complaints he had taken calomel till it affected his mouth. When M. Dance first saw him he had severe frontal headach, with contraction of the eyelids as if the light annoyed him; but the skin was not hot, the face not flushed, and the pulse was slow and small. In the course of two or three days he had many paroxysms of severe and gradually increasing pain in the forehead, which at length became so violent that in the fits he tossed about from one position to another, and generally squeezed his forehead firmly upon the pillow. Firm pressure of the head and the cold affusion gave him temporary relief. The pulse at this time was from 45 to 50. After being seven days in the hospital where M. Dance visited him, the symptoms began to abate; but on the ninth day they became as violent as ever. Next day the pupils were much contracted, and the eyes very sensible to the light. The cold bath with the cold affusion, which had been several times used together before with advantage, were advised to be resumed. He walked to the bath and remained in it three quarters of an hour; but on leaving it he fainted away, and died in the arms of the attendants. To the very last his faculties were entire; and there was never any fever.—*Inspection.* The head was examined with great care. The bones of the skull were everywhere sound. The dura mater was closely applied on the subjacent cerebral substance, and apparently stretched by it; and its sinuses contained less blood than usual. The whole convolutions of the brain were flattened, and so squeezed into a mass, that the grooves between them were with difficulty distinguished. The arachnoid and pia mater were firmly connected to the brain and one another, free from vascular injection, and unusually thin. The whole cerebral substance was dense and firm, resembled the white of a hard boiled egg, recoiled after being drawn out like an elastic body, and, when sliced, did not exhibit any appearance of blood-vessels or any red points. The ventricles and base of the brain did not contain a drop of liquid; the former were contracted to half their natural size; and the whole arachnoid surface was as dry as parchment.

Case 2.—A man of ordinary stature, and 24 years of age, having a stupid and somewhat idiotic expression, and actually weak in his intellects, was admitted into the Hotel-Dieu on account of occasional pain in the head. He had a disposition to talk incoherently. After the application of a blister to the nape of the neck, and the administration of some antispasmodic medicines he appeared better, and conversed sensibly with his fellow-patients. But six days after his admission he was seized with convulsive spasms of three minutes duration; which recurred five times in the course of forty-eight hours. Leeches were applied behind the ears, and sinapisms to the legs. On the morning of the ninth he had another fit, which was the last. It was succeeded by flaccidity and insensibility of the limbs, deep coma, dilated pupils, stertorous breathing, and occasional convulsions of the limbs; and he died about seven in the evening.—*Inspection.* The membranes were closely applied to the brain, and appeared too tight to hold it. The whole convolutions were remarkably flattened, and so close as to appear glued together. The cerebral substance was very firm, compact, singularly dry, of a duller white colour than usual, and not presenting either red points or serosity when cut into. The ventricles, as well as the whole sac of the arachnoid, were entirely free of liquid. The cerebellum was natural. The spinal chord was not examined.

Case 3.—A stout tall painter, 30 years of age, whose reason had for some months become gradually more and more deranged, was found lying motionless on the ground, and died a few days after he was taken to the hospital of La Charité. During the course of the illness immediately preceding his death, he was not conscious of what he said or did, answered questions incoherently, and did not retain sensibility except in the face. When the head was opened, the convolutions were found almost entirely effaced, the ventricles so contracted that they could hardly have contained a nut, the parenchyma of the brain dry, dense and heavy, and the usual serosity every where wanting. This case is extracted from the first volume of the *Journal de la Clinique.*

Case 4.—A house-painter, 30 years of age, and of stout habit, was admitted into the Hotel-Dieu on account of epilepsy, with which he was attacked three or four times a-day. He understood questions imperfectly, and answered them slowly and forgetfully. The pulse was full and frequent, the breathing broken by sighs, the skin hot, the face flushed. He had been subject for six years to determination of blood to the head, causing fits of stupidity; and for three years these fits had assumed the form of regular epilepsy, and had gradually become of more and more frequent occurrence. Three days before his admission he had been attacked with violent convulsions after drinking some punch. On his admission blood-letting was resorted to, but with the effect rather of increasing than of diminishing the fits. Next day after remaining for some time in a state of apparent astonishment, he fell into deep coma, with loss of sense and motion, closed eyelids, contracted pupils, stertorous breathing, very hurried pulse, and occasional rigidity of the limbs. He expired early the same morning.—*Inspection.* The bones of the skull were from four to five lines thick, and the diploe as dense as the tables. The sinuses of the dura mater contained a good deal of blood. The dura mater had a livid appearance, in consequence of its translucency enabling it to transmit the dark colour of the vessels beneath. The whole arachnoid was remarkably dry. Neither in its sac, nor in the ventricles, nor in the base of the skull, nor at the commencement of the spinal canal, was there a drop of liquid to be seen. The pia mater adhered firmly to the brain. The whole convolutions were flattened and squeezed together, so as not to leave any interstice between them. The cerebral substance exhibited fewer red points when cut than natural, and resisted tearing more than usual, but did not feel firmer, and had not undergone any obvious change of colour. The parietes of the ventricles were dry, and closely applied to one another, but the cavities were not contracted in capacity. The pons varolii and cerebellum were healthy. When the body was reversed, so that the head became lowest, no fluid issued from the spinal canal. The spinal chord was natural, except at its lower end, where it was a little softened. The traces of a fracture of the second lumbar vertebra were visible, and the column of the spine was inclined slightly forward. This was supposed to be the consequence of a fall he experienced immediately before his fits assumed the epileptic character.

SURGERY.

Lancetted Stilette for dividing stricture of the urethra proposed by Mr M'Ghie.—In the review of Mr Stafford's work on the treatment of stricture of the urethra by division with a lancetted stilette, (see last Number, p. 147), it was stated, that in all probability, if this treatment should come into general use, a more simple instrument than that proposed by him, would be resorted to by the surgeon, namely, a catheter which may pass down to the stricture, and a lancetted stilette passing through it, "and of such a curvature as to divide the stricture in the axis of the urethra for a definite and exact space." We inadvertently forgot, and are now reminded, that such an instrument was proposed both for this purpose, and for puncturing the bladder from the urethra through the prostate, by Mr J. M'Ghie of Dumfries. See his paper in this Journal, July 1823, xix. 361.

Medical Graduations at Edinburgh.—On the 13th of July 1829, the Senatus Academicus of the University of Edinburgh conferred the degree of Doctor in Medicine on the following Gentlemen, in number ninety-nine, after having gone through the appointed examinations, and defended publicly their inaugural dissertations.

Of Scotland.

Alexander Anderson, - De Hydrarthro.

James Arnott, - — De Effusione Sanguinis in Cranio.

John Bain, - - — Dyspepsia.

Alexander Black,	De Aquæ in Febribus Usu.
Henry A. Bruce,	— Pneumonia.
William Dassauville,	— Delirio Tremente.
James Esdaile,	— Narcoticis.
Hugh Falconer,	— Chorea.
Benjamin Forbes,	— Inflammatione.
James Grieve,	— Cynanche Tracheali.
Andrew Hasell,	— Febre Flava.
David Hatton,	— Inflammatione Oculi.
Francis Charteris Henderson,	— Usu Moxæ.
James Home,	— Diæta et Regimine.
John Home,	— Cute et ejus Functionibus.
Charles Inches,	— Capitis Injuriis.
Alexander Macdonald,	— iis Membranæ Mucosæ Laryngis Morbis qui Respirationem impediunt, et de Bronchotomia.
William Macgowan,	— Hæmorrhagia.
Alexander Macgowan,	— Diabete.
John Mounsey,	— Paralysi.
William Pirrie,	— Vitiis Tali.
David Reid,	— Cholera Orientali.
Patrick Robertson,	— Viribus quæ Sanguinem movent.
Colin Rogers,	— Dentibus eorumque Morbis et curatione.
Thomas Scott,	— Hepatitide.
James Sibbald,	— Pneumonia.

Of England.

George Bagnal,	De Morbis hæreditariis.
Thomas Alfred Barker,	— Metastasi.
George Brock,	— Iodino.
John Boot,	— Pneumonia.
Marston Buszard,	— Nephritide.
George William Chester,	— Ophthalmo-Blennorrhœa recens Natorum.
Charles Clark,	— Tetano.
Esau Clark,	— Corporis Exercitatione.
John Crabtree,	— Sanguine in Venis congesto.
Joseph Wyatt Crane,	— Asthmate.
William Henry Duncan,	— Ventris in reliquum Corpus Potestate.
William England,	— Ductuum Excernentium Structura et Muneribus.
John James Field,	— Nexu inter se Partium Proprietatumque et Functionum Hominis.
Frederick Wm. Frampton,	De Affectuum Animi Potentia in Febribus Epidemicis.
Henry H. Godeve,	— Exulceratione Phagadænica.
George Henry Heathcote,	— Stethoscopio.
Edward Holmes,	— Rheumatismo.
Richard Baron Howard,	— Hydrocephalo Acuto.
Henry Johnson,	— Absorptione.
George Sarmon Lilburn,	— Uteri Carcinomate.
William Mathews,	— Febre.
Archibald Megget,	— Casibus quibus patet Talus.
Benjamin Noakes,	— Ictero Calculoso.
Robert Norton,	— Fabricæ organicæ Vitiis a quibus pendet Dyspepsia.
William Hall Palmer,	— Dysenteria.
William Reynolds,	— Variola.
George Rogers,	— Hepatitide.
Alexander Frater Sawers,	— Inflammatione.
John Strother,	— Hæmoptysi.
Thomas Swanwick,	— Convalescentia.
Seth Thompson,	— Neuralgia.
John Wing,	— Hæmorrhagia Uterina.

Of Ireland.

Robert Acton,	De Rheumatismo Acuto.
Thomas Barker,	— Lymphaticis.
Hall Bredin,	— Dysenteria Acuto.
James P. Browne,	— Febre Typho.
Connell Vereker Evans,	— Hæmoptysi
Martin A. Evans,	— Hepatitide.
William Fahy,	— Phthisi Pulmonali.
Thomas Furlong,	— Bronchitide.
Andrew Hamilton,	— Scrofula.
William Hanan,	— Enteritide.
Patrick Heffernan,	— Dysenteria.
James Houghton,	— Febre Intermittente.
Randal Young Kenny,	— Podagra.
John King,	— Hydrocephalo Acuto.
Edward Madden,	— Cynanche Tonsillari.
D'Arcy Mahon,	— Hydrargyro.
John M'Ilwain,	— Pneumonia.
James MacKeon,	— Hepatitide.
James Murray,	— Dilutione et Temperatura.

Thomas M‘Dermott, - De Hepatitide Acuta.
Patrick O'Halleran, - — Pneumonia.
William O'Shaughnessy, — Metastasi Rheumatismi Acuti.
Charles Patterson, - — Phlegmatia dolente.
John Peirce, - — Asthmate.
Edward Powell, - — Enteritide.
Johnson Savage, - — Rheumatismo Chronico.
John Scott, - - — Dysenteria.
Henry Hutchinson Stewart, - - — Phrenitide.
Michael Wall, - — Injuriis Capitis.
William Webb, - — Typho.
William Henry Welsh, — Dysenteria.
William Whittaker, - — Hepatitide.

From Portugal.

John Correa de Faria, — Arthritide.

From Russia.

Peter Pelechin, - De Neurosibus in genere.

From Malta.

Alexander S. Allen, - — Aneurismate præsertim Aortæ.

From Canada.

Francis Badgley, - — Ophthalmia Acuta.

From Bermuda.

Adolphus J. Harvey, - — Respiratione.

From Jamaica.

James Campbell, - — Peripneumonia.
James Manby Gully, — Emeticis.
Joseph James Robertson, — Ophthalmia.

From East Indies.

John Cornelius Heyning, — iis Membrorum Injuriis quæ maturam Amputationem desiderant.

Surgical Examinations at Edinburgh.—*August* 2, 1829.—Since August 1828 the following Gentlemen, two hundred and four in number, have appeared before the Royal College of Surgeons of Edinburgh, and having produced certificates of their completing the course of study prescribed by the College, and having been admitted on examination, have been found fully qualified to practise the arts of Anatomy, Surgery, and Pharmacy, and have received Diplomas accordingly.

Of Scotland.

William M‘Laren,
John Gray,
James Scott,
Henry Grant,
William Sprot Clark,
David Bridges,
James Lawrie,
William Dassauville,
David Hatton,
Alexander Anderson,
John Mortimer,
John Neilson,
John J. M. Abercromby,
Alexander M. M. Minto,
John James Boswell,
William Carfrae,
Thomas Hunter,
Andrew Fothergill Martin,
Thomas Ross,
John Trail,
Colin Brown,
John Campbell,
William M‘Gill,
David Dick,
James Cowan,
John Balfour,
Thomas Thomson,
George Henderson,
Robert Logan,
Charles Young Trotter,
William Hay Christison,
John Mounsey,
David Harvey,
Joseph Milligan,
John Otto,
John Bevan,
Robert Montgomery,
William Young,
John Joseph Johnston,
Thomas Hunter,
Christopher Johnston,
John Binney,
William Ogilvy,
David Colville Carruthers,
Alexander Stuart,
Alexander Peacock Steven,
Archibald Dickson,
Alexander Longmore Black,
Robert Band,
Andrew Ramsay,
John Adamson,
David Lyell,
John Lyell,
George Shaw Patterson,
Alexander Bruce,
David Souter,
Ebenezer Marshall Duncan,
David Arrot,
John Stephen Hampton,
Robert Henderson,
James Edward,
Charles Mitchell,
William Fisher Preshaw,
William Durie,
Robert Graham Mustard,
John Malcolm,
James Armit Miller,
David Anderson,
David Whyte,
Robert Lamont,
Stewart Carson,
Alexander Reid,
William Fraser,
Alexander Macgowan,
James Black,
William Wyllie,
Charles Auld,
Thomas Fender,
Francis C. Henderson,
William Gordon Davidson,
Thomas Fraser,
Peter Niddrie,
William Gordon,
John Mackie,
John Halliday,
George Cameron Gerran,
Robert Potts,
James Stedman,
James Simpson,
Archibald Colquhoun Ross,
Alexander M‘Arthur,
Robert M‘Crae,
Handayside Duncan,
Robert Wallace,
William Shepherd Cowan,
John Reid,
James Ogilvy,
Charles Ferrier,
Thomas Brown,
James M‘Kenzie,
Andrew M‘Pherson,

Alexander Miller,
George Graham,
George Brown Clerk,
Alexander Stevenson,
Duncan Campbell,
John Scott,
George Butchart,
Charles Rattray,
John Davidson,
James Crerar,
Duncan M'Gregor,
Tertius M'Donald,
Charles Menzies,
Peter Roy,
Robert Daniel Munn,
John Agnew,
William Lambert,
James Sibbald,
John Burns,
Alexander Anderson,
John Stewart Rutherfurd,
James Smith.

From England.

James Laidlaw,
Meredith Gairdner,
William Henry Robertson,
James Thomas Bell,
William Harvey,
William Francis Buchan,
Thomas Leslie Gregson,
Thomas Dalyell Harrison,
Alfred Prentice,
Francis Cooper,
Mathew Salmon Kent,
Adam Bell,
Robert Hyde,
Edward Lees,
Robert Addison,
Richard Anderson,
George William Dyke,
John Hopkinson Boot,
James Manby Gully,
Thomas Leddan Kelsall,
Francis A. B. Bonney,
William Creighton,
Robert Tindle,
John Wright,
Esau Clark,
Joseph Teale Sigston,
Benjamin Le Tall,
Thomas Ægar,
Willson Cryer,
Henry Pratt.

From Berwick on Tweed.

John Manners,

From Ireland.

William Ross Madden,
William De Little,
Frederick George Breck,
William Simpson,
William Campbell,
John M. Cunningham,
Will. J. M. Cunningham,
John Reid,
John Scott,
Francis Campbell,
James Johnston Stoney,
Edward Powell,
Will. B. O'Shaughnessy,
James Barr,
Daniel Donovan,
Thomas M'Dermott.
Howard A. Montgomery,
Roger Foley,
James Lambert,
James Paterson,
William Keowen,
Charles Hurst,
James Hamilton,
Lendrum West,
Hall Bredin,
Martin Augustus Evans,
John M'Arthy,
Connel V. Evans,
Andrew Hamilton,
Francis Kelly,
William Whittaker,
Patrick O'Halloran,
Patrick Hefferman,
Christopher W. Malton,
James King,
Joseph Lynn,
William Hanan,
James M'Keon,
Thomas Beatson Getty,

From Abroad.

Edward Lesslie Dow,
John Wilkie,
John Cornelius Heyming,
Davies Wachope,
Thomas Browne Beech,
Thomas Smith,
Alexander Knox,
James Parry Evans,
Thomas Hayle,
Samuel Carson,
Peter Pelechin.

Regulations to be observed by Candidates, previously to their being taken upon trial for obtaining Diplomas from the Royal College of Surgeons of Edinburgh.

SURGEONS' HALL, *Edinburgh, July* 1829.

In enacting and publishing, from time to time, Regulations respecting the Course of Study to be followed by Candidates for Surgical Diplomas, the Royal College of Surgeons of Edinburgh have been uniformly anxious to evince to the Public, their desire to adopt measures calculated to improve the education of those who are hereafter to have the care of the health of the Community. Accordingly, in the present Regulations, the object of the College has been, to determine the extent and duration of the Course of Study, which, in the present advanced state of medical science, they consider necessary to enable the student to enter on the duties of his profession with credit to himself, and advantage to the Public.

The Royal College are also fully aware, how much the success of the Student, in the prosecution of the various branches of medical science, must depend upon the direction of his early studies; and, under this conviction, they wish earnestly to impress on the minds of parents and others, how important it is to the interest of the Public, and to the future comfort and respectability of the practitioner, that all who apply to the study of Surgery should have the benefit of a liberal education. In addition, therefore, to the positive Regulations on that head now adopted by the College, they are inclined to hope, that Medical Practitioners in every part of the country will be disposed to second their endeavours, to encourage the young men who are placed under their care, or who may apply to them for advice, in the study of the *Latin*, *Greek*, and *Modern Languages*, and of the elements of *Mathematics* and *Natural Philosophy*, as the best preparation for their entering upon a course of Medical and Surgical Education. And they strongly recommend to their own Fellows, and to other Practitioners, not to take any young man as an apprentice, until he shall have gone through this preliminary course.

While they thus recommend in the strongest manner an attention to these preliminary branches of instruction, the College wish to remind the Public, that the profession of Surgery is a practical art, which cannot be acquired without continued personal intercourse with the sick; and this, they believe, can best be obtained by serving an apprenticeship to a regular Practitioner, under whose inspection young men may not only prosecute their studies with the greatest advantage, but have frequent opportunities of being conversant with the sick, and of assisting in preparing and applying the means used for their recovery. The College farther hope, that every Master will direct his Apprentices as to the classes which they ought to attend, and the books which they ought to read; that he will occasionally subject them to examination, to ascertain their progress in the different branches of their education; and that he will explain the nature of the cases which they are attending under his superintendence.

The College have marked, with much satisfaction, the gradually increasing knowledge and attainments of those who present themselves for examination at Surgeons' Hall: And they are inclined to hope, that the observance of the Regulations now enacted will have a tendency to maintain, and to increase, the anxiety of Candidates to raise their acquirements to the highest attainable standard. The College are at the same time aware, that no Regulations which they can adopt will effect this desirable end, unless they are seconded by the influence of parents and guardians, and by the strenuous exertions of those who are devoting themselves to the study of the arduous and responsible profession of Surgery.

On this account, the College have now directed their Regulations to be printed and circulated as widely as possible, in order that all persons interested may be informed of the nature and extent of the course of study required of those who mean to become Candidates for the Diploma of the College; and that the Public at large may be enabled to estimate the extent of professional attainments which the possession of that Diploma necessarily implies.

Schools of Medicine, Courses of Lectures, Qualifications of Teachers, &c.

Every Candidate for a Surgical Diploma must have followed his Studies in a University; or Established School of Medicine: or in a Provincial School specially recognized by the College, and which shall conform to such laws and regulations as have been or may hereafter be enacted.

Under the title Established School of Medicine, are comprehended all places in this country where Diplomas in Surgery are granted, and such foreign Schools as are acknowledged by the constituted authorities of the countries where they exist.

No Provincial School shall be recognised where there is not a General Hospital, containing at least eighty beds, at which regular Medical and Surgical attendance is given, and where there are not established Courses of Lectures on Anatomy and Chemistry.

No Course of Lectures given at a Provincial School shall be recognized, unless it be of the same extent and duration as the Courses required on the same subject in Edinburgh.

The extent and period of study allowed to be gone through at a Provincial School, will be regulated by the means and facility of study which the College receive evidence of its affording; but, in all cases, at least two Winters, or one Winter and two Summer Sessions of the Course of Study required for a Diploma, must be passed at a University, or at one of the Established Scools of Medicine.

In Edinburgh, the Lectures to be attended as part of the Surgical Curriculum shall be delivered by Professors in the University, or Fellows of the Royal Colleges of Physicians or Surgeons there: and elsewhere, by Professors of Universities, or by Fellows of the Royal College of Physicians of Edinburgh, and Fellows or Licentiates of the Royal Colleges of Physicians of London and Dublin, by Fellows of the Royal Colleges of Surgeons of Edinburgh, London, and Dublin, and of the Faculty of Physicians and Surgeons of Glasgow; and by persons holding a Medical Degree or Surgical Diploma, whose Courses of Lectures have been recognized by the College on special application.

No tickets of a Professor or Lecturer shall be recognized, who teaches more than two of the branches required by the College; but Anatomy, with Practical Anatomy; and Chemistry, with Practical Chemistry, shall each, in reference to this Regulation, be considered as one branch.

Course of Study.

Every Candidate for the Diploma of the Royal College, either previously to, or during his Medical education, must have received regular instructions in the *Elements of Mathematics ;* and must have attended a course of *Mechanical Philosophy* of at least *three* months' duration, delivered by a Professor of that branch in a University, a Lecturer in a Public Institution, or a Teacher specially recognized by the College.

The Candidate must have attended the following separate and distinct Courses of Lectures during a period of at least *four* Winter Sessions, or *three* Winter and *three* Summer Sessions, provided that in each Summer Session he shall have attended one or more of the Courses prescribed or recommended by the College, exclusive of Hospital attendance, and also provided that the Summer Courses of Lectures shall not commence till after the conclusion of the Winter Courses.

		Duration at least.
Anatomy,	2 Courses,	Six Months each.
Practical Anatomy,	1 Course, or 2 Courses,	Six Months ; Three Months each.
Chemistry,	1 Course,	Six Months.
Practical Chemistry, The number of Pupils in each Class being limited to 25.	1 Do.	Three Months.
Materia Medica and Pharmacy,	1 Do.	Six Months.
Institutions of Medicine, or Physiology,	1 Do.	Six Months.
Practice of Medicine,	1 Do.	Six Months.
Clinical Medicine, During the period of attendance at the Hospital where they are delivered.	1 Do. or 2 Courses,	Six Months ; Three Months each.
Principles and Practice of Surgery,	2 Courses,	Six Months.
Or Do. and Military Surgery,*	1 Course, 1 Do.	Six Months.
Clinical Surgery, During the period of attendance at the Hospital where they are delivered.	1 Do. or 2 Courses.	Six Months ; Three Months each.
Midwifery, and Diseases of Women and Children,	1 Course,	Three Months.

With the exception of the Courses of Clinical Medicine, Clinical Surgery, and Military Surgery, in which Lectures are not delivered daily, the six months' Courses, delivered in Edinburgh by Fellows of the College, or others, are understood to consist of five Lectures per week for a period of not less than five months.

Two *London* courses of three months each, on any of the above subjects, shall be taken as equivalent to one six months' course.

The Candidate must also have attended for *eighteen* months a Public General Hospital, containing at least eighty beds ; or for *twelve* months such a *Public General Hospital*, and *six* months a *Medical* or *Surgical Hospital*, or *Dispensary*, recognized by the College on special application.

The Candidate shall be required, in addition to the Tickets or proof of entry to the different Classes, to produce *Certificates* of his having attended these Classes, from the respective Professors or Lecturers ; and in the case of Practical Anatomy, the Certificate must express that the Candidate has been actually engaged in the dissection of the human body, under the personal superintendence of the Professor or Teacher, during the course of his attendance.

The Candidate, at the commencement of his examination, will be required to translate into English some portion of a Latin Author.

The following Order of Study is recommended as a guide to the Student, though not absolutely enjoined.

First Year, Anatomy, Chemistry, Mechanical Philosophy, if not previously attended.

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* The Course of Military Surgery must be delivered by a Professor of that branch in a University ; or by a Lecturer, who, in addition to the other required qualifications, has served in the Medical Department of the Army or Navy ; and the Course of Lectures must be of at least six months' duration, Lectures being delivered at least thrice per week.

Second Year, Anatomy, Practical Anatomy, Institutions of Medicine or Physiology, Surgery, Materia Medica and Pharmacy, either in this or the Third year.
Third Year, Practice of Physic, Clinical Surgery, Practical Chemistry, Hospital.
Fourth Year, Surgery, or Military Surgery, Midwifery and Diseases of Women and Children, Clinical Medicine, Hospital.

Besides the Courses of Lectures on the different Branches of Medicine required by the College, they strongly recommend to Students to avail themselves of the opportunities they may possess of attending Lectures on Medical Jurisprudence, Botany, Natural History, Comparative Anatomy, and Pathological Anatomy.

The Duration and Course of Study to be required of Apprentices, whose indentures commenced before 1st January 1823, are still regulated by the laws in force previously to that date: The course of study of Apprentices and others, who entered upon their indentures or their medical studies generally after that date, and before 1st August 1829, will be determined by the rules in force within this period:—The present regulations as to *Endurance and Course of Study* shall take effect as to all who enter upon their medical education *after* the last mentioned date.

The regulations as to *Lecturers*, *Teachers*, &c. &c. are to take effect *immediately*.

Registration.

I. A Book shall be kept in the Hall of the College, for the Registration, at stated times, of all Medical Students who may apply.

II. The Registration shall be conducted by the Conservator of the Museum, or by a Substitute for whom he shall be responsible. He shall enter in separate columns, 1st, The name of each individual; 2d, The Medical Classes, Hospitals and Dispensaries, attended by each during the current season; 3d, The names of his Teachers. He shall register such only as apply personally to him, shall examine all the Tickets produced by each individual, and shall not register any Classes for which Tickets are not produced.

III. Each Student shall pay annually, on his first registration for the year, the sum of two shillings and sixpence.

IV. Each Student, upon being registered, shall be provided with a ticket of admission to the Museum of the Royal College, on certain hours of certain days of the week, to be specified in the ticket.

V. The Book shall be closed for the Registration of the Winter Classes on the 30th November in each year; and of all other Classes at the end of the fourth week from their commencement.

VI. On the day of the election of the Office-bearers of the Royal College, the President shall appoint a Committee of three, whose duty it shall be to fix the days and hours when the Register is to be open for each set of inscriptions; to give due intimation to the Students of these days and hours; and to report to the College, at the first meeting after each set of inscriptions is closed, as to the number and correctness of these inscriptions.

VII. When a Student is prevented by sickness, or other unavoidable causes, from complying with the above regulations, he shall, *as soon as the case admits*, present a statement of the circumstances, with proper evidence, to the Conservator, to be laid by him before the Committee, who shall report their opinion to the College; and if the application is sustained, the individual so applying shall be enrolled in the usual manner.

VIII. All Students whose Classes are thus registered, shall be entitled to receive from the Conservator a Certificate of their Course of Study, attested by his Signature.

IX. A Certificate from the Album of the University, signed by the proper Officer, shall be received as a sufficient proof that the Student presenting it has entered the Classes taught there at the proper period of the course; but it shall also be in the option of Students to register such Classes in the manner described above, and to have them included in the same General Certificate with those of the other Teachers sanctioned by the College.

X. Such Certificates shall be required from all Candidates for Surgical Diplomas, in regard to that part of their medical education which they may have received at Edinburgh.

Examination.

The days of Examination are the first and third Tuesdays of every month.

No Candidate will be admitted to examination before the termination of his last year's course of study.

Applications for examination must be made to the President of the Royal College two days previously to the day of examination.

Every Candidate for a Diploma, on applying to the President for examination, is required to present his tickets and certificates, and also a written statement, containing his name, age, and country, and a list of all the Classes, Hospitals, and Dispensaries, attended during each session of his study.

If the Candidate be an apprentice for three years, he must also produce his discharged indenture. If for five years, he may apply at the end of four without losing any privilege, provided he has written permission from his master, and that the date of his indenture, and whether it be for the freedom or not, is certified at the bottom of the written permission by the Secretary. All apprentices must also state the names of their masters, the dates of their indentures, and length of time for which they were bound.

Printed forms will be furnished, by the Officer of the College, to each applicant, which he will fill up and sign, before applying to the President, who will give him a letter authorizing the Examinators to take him on trial.

The Fees payable to the Funds of the College must be lodged before examination in the hands of the Treasurer, who will certify this upon the President's letter, after inspecting and being satisfied with the certificates.

The Fees will be returned to unsuccessful Candidates, whose names will be concealed.

Unsuccessful Candidates will be remitted to their studies for a period, not less than three months, to be determined by the judgment of the Examinators.

The President, if he judge it proper, can order a meeting on any day, at the request of a Candidate; but, in that case, the Candidate must pay Two Guineas in addition to the customary fees; and this money is not returned to him, in the event of his being rejected.

Fees payable to the Funds of the Royal College.

For a Diploma, the sum of Six Pounds Sterling.

Apprentices of Fellows of the Royal College bound for the freedom, pay no fees to its funds, for Diplomas or Certificates; their other Apprentices pay One Pound, Eleven Shillings and Sixpence.

Candidates for the Certificate of qualification to act as Assistant Surgeon in the Navy, who have not paid for any previous qualification, the sum of Four Guineas.

Assistant Surgeons, who have already obtained Certificates from the College, applying for Certificates for the qualification of Full Surgeon, Three Guineas.

Assistant Surgeons in the Navy, having previously obtained the Diploma of the College, when Candidates for the situation of Full Surgeon, the sum of Two Guineas.

A Surgeon in the Navy, having obtained Certificates from the College, may receive a Diploma, on paying the usual fees to the Secretary and Officer.

An Assistant Surgeon in the Navy, having obtained his Certificate from the College, may receive a Diploma, on paying the difference of expence betwixt that of the Certificate and that of the Diploma, and the usual fees to the Secretary and Officer.

Fees payable to the Secretary.

For a Diploma to a Student or Apprentice, Ten Shillings and Sixpence Sterling; besides Nine Shillings and Sixpence as the expence of vellum, &c. for the Diploma, and box wherein it is contained.

For a Certificate to Surgeon or Assistant Surgeon in the Royal Navy, Ten Shillings and Sixpence.

Fees payable to the Officer.

For a Diploma, or Certificate, Three Shillings; or if he takes charge of getting the Diploma or certificate signed by all the Examinators, Five Shillings Sterling — By authority of the Royal College, (Signed) William Wood, *President.*

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